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ABSTRACT

The National Science Foundation's Undergraduate Faculty Enhancement Program (UFEP) awards grants on a competitive basis to project directors at colleges and universities, professional societies, industry, and other qualified organizations to conduct regional or national seminars, short courses, workshops, conferences, or similar activities for groups of faculty members in the sciences, mathematics, and engineering. UFEP was developed to meet the needs of faculty members who teach undergraduate students. This report summarizes findings of an assessment of the first three years of the program. This assessment was an intensive 2-year study which involved statistical analysis of questionnaire data collected through the mail from 91 UFEP project directors, and through telephone interviews with 469 participants in 1988-90 UFEP projects. Additional information was obtained through discussion sessions with UFEP participants during the meetings of several professional societies. UFEP is meeting many of the needs it was designed to address. Faculty participants indicated that they received substantial benefits from the projects for themselves and for their teaching. Personal growth or renewal, increased knowledge of the field, and increased motivation or stimulation for teaching excellence are benefits most participants believe they received from project participation. The projects provided exposure to new ideas and technologies, which strongly influenced the introduction of new content and equipment into undergraduate courses. The projects successfully reached the intended audiences of "faculty who teach primarily undergraduate students" and groups that have been traditionally underrepresented in science, mathematics, and engineering, although there is room for improvement with regard to minority participation. Information about all available UFEP projects needs to be more effectively disseminated by NSF if all potential audiences for UFEP are to be reached and served and travel costs may need to be subsidized in some way for some potential participants. Contains 49 statistical tables, 17 statistical figures, questionnaires, and technical notes. (JRH)

ED 388 494

Assessment of the National Science Foundation's 1988-1990 Undergraduate Faculty Enhancement Program

FINAL REPORT

Sponsored by the National Science Foundation
Conducted by Westat, Inc., Rockville, Maryland

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PREFACE

This report summarizes the findings of an assessment of the first 3 years of the National Science Foundation's Undergraduate Faculty Enhancement Program (UFEP). UFEP awards grants on a competitive basis to project directors at colleges and universities, professional societies, industry, and other qualified organizations to conduct regional or national seminars, short courses, workshops, conferences, or similar activities for groups of faculty members in the sciences, mathematics, and engineering. The activities must be designed explicitly for their capacity to enhance participants' teaching activities for undergraduate students.

In 1990, NSF awarded a contract to Westat, Inc. to conduct an assessment of UFEP since the inception of the program. This intensive 2-year study involved statistical analyses of questionnaire data collected through the mail from 91 UFEP project directors, and through telephone interviews with 469 participants in 1988-90 UFEP projects. Additional information was obtained through discussion sessions with UFEP participants during the meetings of several professional societies. The extensive data collected in the course of this study are summarized in this report.

As part of the assessment, an Advisory Committee was appointed to provide assistance in the design of the assessment and the development of the questionnaires, and in the interpretation and presentation of the findings. An interpretive overview of UFEP and the results of the assessment, prepared by members of this Advisory Committee, is included as part of this report.

This report is based upon work supported by the National Science Foundation under NSF contract number SPA-9054950. Any opinions, conclusions, or recommendations expressed in this report are those of the authors and do not necessarily reflect the views of the National Science Foundation.

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This assessment of the Undergraduate Faculty Enhancement Program was conducted by Westat, Inc., under contract to the Division of Research, Evaluation, and Dissemination in the Education and Human Resources Directorate (EHR) of the National Science Foundation (NSF).

An expert Advisory Committee provided overall guidance to the study, contributed to the survey design and review of this report, and contributed an interpretive overview:

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Contractor staff and consultants who played a significant role in this assessment were:

- Laurie L. Lewis, Project Director
- Howard Hausman, Project Consultant
- Cindy Gray, Operations Manager
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- David Morganstein and Bridgett Bell, statisticians
- Sylvie Warren, Susan Hein, and Carol Litman, report production

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- Roger G. Baldwin, Program Director, Division of Research, Evaluation, and Dissemination, EHR, NSF
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We also acknowledge the indispensable contributions of the scientists, mathematicians, and engineers who participated in the study.

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EXECUTIVE SUMMARY

The Undergraduate Faculty Enhancement Program (UFEP) was developed by the National Science Foundation (NSF) to meet the needs of faculty members who teach undergraduate students. NSF recognizes that the faculty members most closely associated with undergraduate teaching often have limited opportunities to become familiar with new concepts and have limited access to the laboratory resources of the advanced research community. These faculty members need help in gaining access to the new developments and instrumentation, as well as knowledge of how these developments and instrumentation may be incorporated into undergraduate courses and laboratories. They also need opportunities to interact with colleagues and experts in the field. UFEP was designed by NSF to provide these opportunities for undergraduate teaching faculty.

Under UFEP, NSF makes grants to project directors at colleges and universities, professional societies, industry, and other qualified organizations to conduct regional or national seminars, short courses, workshops, conferences, or similar activities for groups of faculty members in the sciences, mathematics, and engineering. These activities must be designed explicitly for their capacity to enhance participants' teaching activities for undergraduate students. The emphasis of the project must be on the active involvement of the participants in working with the topic of the project and in interaction with experts in the field and fellow participants. Through these workshops, NSF also seeks to encourage the increased participation of underrepresented groups in science, mathematics, and engineering.

Assessment Procedures

In September 1990, NSF awarded a contract to Westat, Inc., of Rockville, Maryland, to assess the effectiveness of UFEP during its first 3 years of operation. This included projects conducted during 1988, 1989, and 1990. This report presents the principal findings based on data collected through mail questionnaires completed by 91 out of the 92 eligible UFEP project directors, and telephone interviews conducted with a sample of participants in UFEP projects. A 97 percent response rate (469 interviews) was obtained during the telephone interviews. Data from the participant interviews are weighted to represent the universe of UFEP participants.

Certain atypical projects were excluded from the main data collection. Excluded were four conferences to which UFEP contributed funds, one faculty-mentor project, and the very large projects conducted by the American Society for Engineering Education and the National Chautauqua Workshop Program. These two large projects were excluded because their size and variability would have allocated too much of the participant sample to these projects and reduced the precision of the estimates based on participant responses. Each of the excluded projects is discussed in Appendix A of the report.

An Assessment Advisory Committee was appointed to provide assistance in the design of the assessment and the development of the questionnaires, and in the interpretation and presentation of the findings. The Advisory Committee also wrote the interpretive overview that appears with the report. Additional information for this interpretive overview was obtained during visits to professional society meetings that grew out of the Advisory Committee's concern that feedback about UFEP be obtained from appropriate members of the disciplines who are not directly connected with UFEP. The Advisory Committee was interested in evaluating the effect of UFEP within the larger context of the disciplines, seeking to answer the general question of whether UFEP was meeting the needs of the disciplines.

During the professional society meetings, discussion sessions were also held with groups of faculty members who had been participants in UFEP projects. Discussions with participants focused on issues such as their successes and problems in using and implementing what they had learned at the project when they returned to their home institution; the strong and weak points of the projects (e.g., length, type of activities, followups after the workshop ended); and suggestions to NSF about how to improve UFEP in the future. Insights from these discussions with participants are included in the interpretive overview and conclusion sections of the report.

Projects Supported by UFEP

During the first 3 years of operation (FY 1988 - FY 1990), the Undergraduate Faculty Enhancement Program awarded approximately $6.7 million to 92 projects, each of which supported one or more workshops or short courses serving an estimated 2,890 participants. This report is based on responses provided by project directors to a survey questionnaire and by participants in the workshops and short courses to a telephone interview.

UFEP also contributed $127,100 toward 4 conferences, which were attended by about 1,150 people, and $61,400 toward a Faculty-Mentor project for 9 faculty members run by the American Society for Microbiology. In addition, UFEP contributed approximately $1.1 million in operating funds to the American Society for Engineering Education Faculty Professional Development Program and the National Chautauqua Workshop Program for courses in 1988-90, which together served about 3,400 people. These projects are described in Appendix A of the report.

Project Characteristics and Activities

Workshops and short courses varied substantially in length, ranging from a few days to 4 weeks. Almost half of the projects (45 percent) had workshops that lasted 1 week or less (most of these were either 5 days or 1 week); about one-third of the projects had workshops that lasted between 1 and 2 weeks (a couple of projects were 10 days, and most were 2 weeks); and the remaining 22 percent of projects had workshops that lasted more than 2 weeks (ranging from 17 days to 4 weeks). Projects in these categories of duration served 65 percent, 22 percent, and 13 percent of the participants, respectively.

Projects also served varying numbers of participants; a few projects had fewer than 10 participants, while a couple of larger multiyear projects served 200-300 participants each through multiple workshops and short courses. About one-third of the projects were in each of the categories of fewer than 20 participants, 20-29 participants, and 30 or more participants.

Almost all of the 91 projects included lectures or seminars (90 projects) and laboratory or computer sessions (82 projects) during their workshop sessions. Other activities used frequently during workshop sessions were small discussion groups (67 projects), participant presentations (54 projects), and participant projects (49 projects). Project directors were also asked to select up to three activities that were their major workshop activities. Most frequently mentioned as "top three" activities were lectures or seminars (81 projects), laboratory or computer sessions (73 projects), participant projects (31 projects), and small discussion groups (29 projects).

Almost all projects (89 out of 91) had followup activities or continuing contacts of some kind with project participants. The most frequent followup activities were sharing of materials among participants (58 projects), continuing technical assistance to participants (55 projects), sending written reports from participants to the project director (49 projects), and organizing informal group get-togethers (48 projects). Only 23 projects had followup activities that involved formal group sessions at scheduled times as a continuing part of the project.

Project directors in UFEP are free to recruit and select participants in the ways they see as most appropriate, as long as they follow the general guidelines established by NSF. The most frequently used recruitment strategy, reported by the directors of 71 projects, was to send program announcements to department chairs or deans, and ask them to bring the program to the attention of faculty members who might want to participate. Other frequently used strategies were sending posters or brochures for posting in departments and placing announcements in newsletters or journals, both used by the directors of 51 projects.

When asked whether they tried to increase the number of applications received from members of various target groups, directors of 65 of the projects indicated that they targeted one or more groups for recruitment. The directors of more than half of the projects (54 of 91) tried to increase the number of minority faculty who applied, and the directors of 44 projects tried to increase the number of women faculty who applied. Faculty members from 2-year colleges were targeted by directors of 22 projects; directors of 5 projects targeted faculty members with physical disabilities.

The most common recruitment approach used by project directors who tried to increase the number of applications received from specific groups was to target mailings or recruitment to certain kinds of faculties or schools; directors of 43 projects used this approach. Similarly, directors of 21 projects seeking certain groups of faculty members for their projects used advertising or application materials that included a statement indicating that applications from these groups were

encouraged. The only other approach mentioned frequently was direct contacts (e.g., calls or visits) to department chairs or others at a school.

Most projects were staffed with other members of the project director's institution. Among the 77 projects in this group, 67 used other faculty members as project staff; other people in the institution, such as graduate students, were used by less than half of the 91 projects. More than half of the projects (54 out of 91) had project staff that came from outside the project director's institution. The most frequent source of these additional project staff was other colleges and universities, used by 45 projects; people from industry, used by 17 projects; people from professional organizations or societies, 15 projects; and people from government agencies, 12 projects.

Participant Information and Support

Participants learned about the faculty projects they attended in a variety of ways. The most frequent means was through a flyer, poster, or letter put up in the department or circulated by faculty mail (42 percent). Other important sources of information about the projects were direct mailings received by the participant (23 percent), and notices in a journal or newsletter, or at a professional meeting (19 percent).

The issue of who paid the participant's travel costs to the faculty project is of interest since the UFEP program guidelines indicate that the home institution of the participant is expected to cover these expenses. This is one way that institutions can demonstrate their support for their faculty's participation in such programs. However, only 64 percent of participants indicated that their home institution or department paid for their travel, while 22 percent of participants paid for travel themselves. Department chairs or deans could demonstrate interest and support for their faculty's participation in other ways, as well. Approximately three-quarters of the participants indicated that their department chair or dean expressed a great or moderate degree of interest both before and after their attendance at the UFEP workshop. Over half (55 percent) of participants indicated that after they returned from the faculty project, either they or their department chair or dean had purchased, or applied to purchase, equipment or instructional materials related to the project.

Participant Outcomes

Participants were asked to indicate how valuable or worthwhile the project was, overall, using a 5-point scale, with 1 being "not at all valuable or worthwhile" and 5 being "very valuable or worthwhile." The perceived value of the projects was very high, with 45 percent of participants giving the project they attended a rating of 5, and an additional 40 percent of participants giving their project a rating of 4. Using the same 5-point scale, participants were asked to indicate how valuable or worthwhile certain activities and resources associated with faculty projects were to them. Participants could also indicate that certain activities or resources were not applicable to their project. Activities and resources associated with the faculty projects were generally perceived as being quite valuable or worthwhile. Most noteworthy for their frequency (i.e., most projects had them) and their very high ratings (ratings of 4 or 5 by three-quarters or more of participants) were interactions with instructors, informal

interactions with other participants, content of the lectures or seminars, hands-on learning activities, and materials to be taken back to their school.

Participants were asked to indicate whether they had engaged in a variety of activities since returning from the faculty project, regardless of the relationships of those activities to the faculty project attended. When asked to indicate the extent to which their experience at the faculty project influenced their work, more than 80 percent of participants indicated that they had modified their teaching methods (81 percent), acquired new equipment, materials, or computer software for undergraduate courses or laboratories (86 percent), introduced new content into existing undergraduate courses or laboratories (93 percent), and incorporated equipment, materials, or computer software into undergraduate courses or laboratories in ways in which they had not previously been used (81 percent). In addition, a majority of participants developed new undergraduate courses or laboratories (62 percent) and participated in formal programs designed to develop curriculum or improve instruction (63 percent). With the exception of participation in curriculum development programs, most participants who engaged in these course-related activities indicated that their activities had been moderately or strongly influenced by their experience at the UFEP project.

In addition, most participants (92 percent) indicated that they had shared with colleagues new materials or skills acquired through the UFEP project. Most of these participants said that they had been moderately to strongly influenced by their experiences at the faculty enhancement project they attended. Almost all participants (95 percent) had attended professional meetings, seminars, or workshops, and most (81 percent) had gained competence in a new area of their own or another discipline. Although about half (53 percent) of the participants subsequently delivered a paper at a professional meeting, and 43 percent submitted an article to a professional journal, the participants who engaged in these professional activities were not strongly influenced to do so by experiences at the faculty enhancement project.

Faculty members can benefit in a number of ways from participating in these faculty development projects. Participants were asked to indicate the extent to which they derived certain benefits from their participation, using another 5-point scale, with 1 being "not at all" and 5 being "very much." Benefits that received the highest ratings were increased knowledge of the field, given a 4 or 5 rating by 76 percent of participants; personal growth or renewal and increased motivation or stimulation for teaching excellence, each given a 4 or 5 rating by 73 percent of participants; and increased contacts with colleagues from other institutions, given a 4 or 5 rating by 64 percent of participants.

One kind of activity encouraged by UFEP is the introduction of new or innovative technologies relevant to undergraduate teaching responsibilities. Participants were asked whether the faculty project they attended introduced them to technologies that were new to them, or that they had never previously had a chance to try. More than three-quarters (78 percent) of participants indicated that their faculty project had

involved such new technologies, and almost half (47 percent) of these participants indicated that the new technologies were very useful or applicable to their undergraduate teaching responsibilities, with an additional 43 percent of that group indicating that the technologies were somewhat useful for their teaching.

Almost all participants (91 percent) had either followup activities or other project contacts after completing the UFEP workshop. Over half of participants reporting such activities indicated that they had correspondence or calls with the project director (52 percent), and that there had been meetings, conferences, get-togethers, or workshops with the project director or other participants (52 percent). Approximately a quarter of participants with followup activities or contacts reported receiving a newsletter (29 percent), corresponding with or calling other participants (28 percent), and maintaining informal contacts with other participants or the project director (24 percent).

Conclusions

The Undergraduate Faculty Enhancement Program appears to be fulfilling its mandate quite well; that is, it is assisting undergraduate faculty members to learn new ideas and techniques in their fields and to use the knowledge and experience to improve their undergraduate teaching abilities. The project offerings have been enthusiastically received by faculty members, who indicate that they have received substantial benefits from the projects for themselves personally and for their teaching. The projects have provided exposure to new ideas and technologies, which have strongly influenced the introduction of new content and equipment into undergraduate courses. The projects are also reaching groups that have traditionally been underrepresented in the sciences, mathematics, and engineering, although there is room for improvement in this regard.

Program guidelines encourage projects in which participants develop instructional materials that include new ideas and techniques. While this was not measured directly, most participants indicated that, since returning from the faculty project, they had introduced new content into existing undergraduate courses or laboratories; acquired new equipment, materials, or computer software for undergraduate courses or laboratories; incorporated equipment, materials, or computer software into undergraduate courses or laboratories in new ways; modified their teaching methods; and developed new undergraduate courses or laboratories. In addition, most participants indicated that they had shared with colleagues new materials or skills that they had acquired. Participants indicated that these activities had been moderately to strongly influenced by their experiences at the faculty project.

The UFEP program guidelines also specify that projects should permit participants to obtain personal experience working with new ideas and techniques, rather than just hearing about them. UFEP projects were successful in this regard: most of the projects included laboratory or computer sessions during the workshop, and half of the projects included participant projects of some kind as a workshop activity. Three-quarters of participants rated the hands-on learning activities in the projects they attended as highly valuable or worthwhile.

UFEP program guidelines also encourage projects that enable participants to work with and evaluate innovative technologies relevant to their academic responsibilities. UFEP projects also accomplished this goal: three-quarters of participants indicated that the project they attended introduced them to technologies that were new to them, or which they had never previously had a chance to try. Of the faculty introduced to new technologies, 90 percent rated these technologies as very or somewhat useful or applicable to their undergraduate teaching responsibilities. Projects that allow participants to work with industrial scientists, mathematicians, and engineers are also encouraged by the program guidelines, and one in five UFEP projects used people from industry as part of their project staff.

Participants perceived the UFEP projects to have been highly beneficial. The overall evaluation of the project they attended was very high, with 85 percent of the participants indicating that the project was highly valuable or worthwhile. The activities or resources rated as most valuable or worthwhile were interactions with instructors, informal interactions with participants, content of the lectures and seminars, hands-on learning activities, and materials to be taken back to their school. The value of interactions with instructors and other participants was especially apparent during the conversations with participants held at the professional society meetings. Repeatedly, participants said that the chance to interact with faculty colleagues was a very important part of the workshops, and that many of the good ideas about how to apply what they were learning in the workshops came from these interactions. The intensive, residential nature of the workshops was highly beneficial in this regard.

The extent to which specific benefits were perceived to have been obtained through the project were particularly high for increased knowledge of the field, personal growth or renewal, increased motivation or stimulation for teaching excellence, and increased contacts with colleagues from other institutions. These benefits reflect those that NSF intended when it established UFEP: to have undergraduate teachers who are up to date in their knowledge, excited about their disciplines, and regard the teaching of undergraduates as important and rewarding.

UFEP served its intended target audience of "faculty who teach primarily undergraduate students" (UFEP Program Announcement and Guidelines for projects beginning in 1989). Almost half (47 percent) of the faculty participants were from academic departments where the highest degree granted was a bachelor's degree; an additional 18 percent of participants were from departments where the highest degree granted was an associate's degree. Almost all (89 percent) of the participants had recently taught introductory courses, and 75 percent had recently taught upper division undergraduate courses. Thus, the faculty served were indeed those who teach primarily undergraduate students. The faculty served were also relatively removed from their own graduate training -- over a third (37 percent) of participants had received their highest degree more than 20 years ago, and an additional 33 percent had received their degree 11-20 years ago. These participants may be especially able to

benefit from exposure to new theoretical developments and instrumentation.

UFEP also targeted and served groups that have been underrepresented in science, mathematics, and engineering, although there is room for improvement in this regard. According to the National Center for Education Statistics (*1991 Digest of Education Statistics*), underrepresented minorities (i.e., all minority groups except Asians) constituted 2 percent of engineering and 3 percent of natural sciences full-time regular instructional faculty in 1987-88; women constituted 2 percent of the engineering faculty and 17 percent of the natural sciences faculty. In UFEP, however, 6 percent of the faculty participants were from underrepresented racial or ethnic minority groups, and 21 percent were women. Faculty from Historically Black Colleges and Universities (HBCUs) constituted 6 percent of the UFEP participants, although they were only about 2 percent of science and engineering faculty nationwide. Faculty members from HBCUs attended 48 percent (44 of 92) of the UFEP workshops Thus, underrepresented minority and women faculty participated in UFEP at a slightly greater rate than their rate of employment as faculty members in science and engineering, and they were widely dispersed across the UFEP projects.

One point that emerged from discussions with participants at the professional society meetings was that travel costs may present a problem for some participants and potential participants. While NSF expects that the home institution will pay travel costs for the participant, only 64 percent of participants had their travel paid in this way. Lack of travel funds was also the most frequently given reason for not attending followup activities. Discussions with participants revealed that for many, travel was limited to workshops within driving distance of their home institution, either because this was the only travel for which their department had funds, or because they were paying for the travel themselves. Some relied on the stipend they received from the project to help defray their travel expenses. Since the participants with whom these discussions were held were those who had managed to secure funding (or provide it themselves) to both the workshop and a professional society meeting, it is likely that travel funds were an issue for others, especially for potential participants who did not attend a workshop. For some faculty, lack of travel funds may act to deter participation, or at least to limit the choice of workshops to those geographically close to the home institution.

Another point that emerged from the participant discussion sessions was that workshop length may be an important consideration for many participants and potential participants. While most participants felt that the workshop they attended was the right length for the amount of material covered (i.e., that the project directors had done a good job of matching length and content), many participants expressed a preference for 1-week workshops. While longer workshops may have some benefits associated with them, such as being able to cover more material, these participants felt that longer workshops deter attendance, especially of teachers from community colleges (with multiple teaching assignments and year-round sessions) and those with family responsibilities. Short workshop sessions were the norm for these UFEP projects, with 45

percent of the projects having workshop sessions ranging from 5 days to 1 week. Thus, there seems to be a fairly good match in terms of workshop length between participant preference and workshop offerings.

It is also apparent that the dissemination of information by NSF about all available project offerings is not as effective as it could be. While almost all UFEP workshops were fully subscribed, if the program is to grow to meet the needs of a larger proportion of undergraduate faculty, timely information concerning UFEP projects must be more effectively disseminated. One approach would be for NSF to heavily advertise that the recently-developed brochure listing all UFEP projects that will be offered during a coming year is available from NSF, and can be obtained in either paper copy or electronic mail versions. Such advertising could begin in late fall, specifying when the brochure is expected to be available. This would alert faculty to begin thinking about UFEP workshops as a possibility when making their summer plans.

In conclusion, the Undergraduate Faculty Enhancement Program is meeting many of the needs it was designed to address. Faculty participants indicated that they received substantial benefits from the projects for themselves and for their teaching. Personal growth or renewal, increased knowledge of the field, and increased motivation or stimulation for teaching excellence are benefits most participants believe they received from project participation. The projects provided exposure to new ideas and technologies, which strongly influenced the introduction of new content and equipment into undergraduate courses. The projects successfully reached the intended audiences of "faculty who teach primarily undergraduate students" and groups that have been traditionally underrepresented in science, mathematics, and engineering, although there is room for improvement with regard to minority participation. However, information about all available UFEP projects needs to be more effectively disseminated by NSF if all potential audiences for UFEP are to be reached and served. In addition, travel costs may need to be subsidized in some way for some potential participants to be able to take advantage of the benefits available through UFEP projects.

INTERPRETIVE OVERVIEW

A Statement from the Assessment Advisory Committee

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In 1986, a task force headed by Homer Neal reported to the National Science Board about the state of college-level education in the United States in mathematics, engineering, and the sciences.[1] Recognizing that the essential bridge between the schools and the national apparatus for research and development is undergraduate education in mathematics, engineering, and the sciences, the Neal Report made several recommendations. Among these was the recommendation that the National Science Foundation establish "a comprehensive set of programs to catalyze and stimulate national efforts to assure a vital faculty, maintain engaging and high quality curricula, develop effective laboratories, and attract an increasing fraction of the Nation's most talented students to careers in engineering, mathematics, and the sciences." This report led to the establishment of a number of new NSF programs, including the Undergraduate Faculty Enhancement Program.

The evaluation of UFEP by the Advisory Committee considered effectiveness in several areas: did the projects funded meet the needs of the participants, did the program as implemented meet the needs of the profession, and were the program and criteria as defined by NSF appropriate to meet the program goals?

Impact of the UFEP Projects on the Participants

The National Science Foundation believes that faculty members who are current in their field and excited about their disciplines are more effective teachers, and that this is especially crucial in undergraduate education. By this measure, UFEP is a very effective program. Both participants and project directors expressed uniform enthusiasm for the projects in which they were involved. Participants stated that the opportunity to work with the experts in the field was invaluable in their professional development, and that the contacts made in the various workshops with other faculty members, as well as with the project director, proved extremely important in their ability to incorporate the information of the workshops into the curriculum at their home institution.

A primary goal of UFEP is to assist undergraduate faculty members in learning new ideas and techniques in their fields, and in using the knowledge and experience to improve their undergraduate teaching abilities. Based on the assessment by the participants and the project directors, this goal was met very satisfactorily. Faculty members found the projects to be highly valuable or worthwhile. The participants felt

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[1] National Science Board. 1986. *Undergraduate Science, Mathematics and Engineering Education*. NSB 86-100. Washington, D.C.: NSB Task Committee on Undergraduate Science and Engineering Education.

that the format of the project they attended was appropriate for its topic, but also expressed a concern that workshops longer than 2 weeks were not as accessible to many faculty members involved in summer school or with other constraints.

Incorporation of this knowledge into the classroom is an important goal of the projects. Almost all of the participants who were introduced to new technologies at the UFEP project they attended found that the new technologies were useful or applicable to their undergraduate teaching responsibilities. A more important concern is whether faculty members were able to transfer this information to the classroom or laboratory. More than three-quarters of the participants reported modifying teaching methods, introducing new content in courses and laboratories, acquiring new equipment, and incorporating that equipment into undergraduate courses and laboratories. The majority of the participants who had made these changes felt that their experience in the UFEP project influenced these instructional improvements.

One barrier to remaining up to date in their disciplines for many faculty members involved in undergraduate instruction is the relative scientific isolation of the faculty member. He or she is frequently the only one in a department in a particular subdiscipline. This problem is particularly acute for faculty members in small departments, although intellectual isolation is also possible in larger departments. Participant data show that for chemistry, biology, and computer science, in particular, the majority of participants came from departments that are relatively small. Thus, an unanticipated benefit of the program has been to reduce the isolation of many faculty members in small departments.

Impact of UFEP on the Profession

The Advisory Committee was particularly interested in evaluating the effect of the program in the disciplines involved, and in examining that effect in a larger context than the responses of the participants and project directors would allow. As described in the report, information was solicited from professional organizations or groups of faculty members from the disciplines of biology, chemistry, engineering, mathematics, and physics.

A major concern of the Advisory Committee was whether the program was funding an appropriate range of topics in each field; the responses of the members of the professional societies varied according to the discipline, with the responses from the physics and chemistry communities representing the extremes of the spectrum. Some members of the American Physical Society Committee on Education expressed some concern about missing topics, suggesting that it may be necessary to target certain topics or to solicit proposals in certain areas. Members of the Committee on Professional Training of the American Chemical Society felt that, in general, the topical coverage was appropriate. They were in favor of allowing the peer review process to select the best projects, rather than attempting to target certain topics for funding.

UFEP is currently restricted to programs that are not purely pedagogical in nature, and this was seen by some members of the professional societies as a problem for projects in mathematics and engineering, and to a lesser extent in physics. In these disciplines, members of the professional societies saw a need to improve the skills of faculty members teaching introductory courses. This was seen as especially important in making the workshops valuable to faculty members at

community colleges. In addition to favoring a relaxing of the ban on pedagogical projects, some members of the Faculty Development Committee of the Mathematical Association of America expressed interest in projects dealing with general curriculum issues.

UFEP might be seen as an excellent avenue to disseminate the results of NSF-supported research to the university/college community, but the members of the professional societies differed substantially on whether they perceive that as a major need of faculty members in their areas. Some representatives stated that since research topics often do not have counterparts in the undergraduate curriculum, faculty members may not need to be exposed to these topics. On the other hand, research topics often provide the justification for the basic preparation provided in introductory courses. Both teachers and students can be excited about covering the basics when they understand what cutting-edge results can be achieved by careful preparation. Faculty members may benefit from the intellectual stimulation of learning about cutting-edge research even when it cannot be directly translated into their teaching syllabi. Some representatives expressed concern, however, that relatively few faculty members from major research institutions were represented among the principal investigators of the projects funded, suggesting that information about cutting-edge research was not being transmitted by the faculty members actually involved in the research.

Effectiveness of UFEP in Meeting its Goals

The program is designed to assist faculty members teaching undergraduate students by exposing them to new experimental techniques and the way those techniques can be implemented in the curriculum, to recent theoretical developments, to knowledge that cuts across their discipline and others, and to experts in the fields. From the vantage point of both the participants and the project directors, these goals were very effectively met. The Advisory Committee, however, has concerns about the audience reached by this program, with particular concern about the level of professional activity and the racial/ethnic balance of participants.

The participant interviews showed that faculty members who were involved in UFEP projects were particularly active, with nearly all having attended professional meetings, seminars, and workshops in the 3 years prior to their participation in the UFEP project. Even more striking, nearly half of the participants had submitted an article to a professional journal in that same period of time. For comparison purposes, one can consider the activity in this area by faculty at a selected set of liberal arts colleges that "have historically expected their faculty to perform research".[2] A study of 50 research-active liberal arts colleges from 1979-84 showed that 58 percent of the faculty had published at least one article.[3] The UFEP data show, in comparison, that 54 percent of the faculty participants at 4-year schools had submitted an article to a professional journal in the 3 years prior to their attendance at a UFEP workshop, a level of activity very similar to that of faculty members at those 50 research-active liberal arts colleges. This strongly suggests that a significant number of the faculty members who attended

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[2]Ruscio, K. P. *The Distinctive Scholarship of the Selective Liberal Arts College.* Journal of Higher Education, 58 (1987):205-22.

[3]Carrier, S., Davis-Van Atta, D., and Frankfort, F. *Educating America's Scientists: The Role of the Research Colleges.* Paper presented at the conference "The Future of Sciences at Liberal Arts Colleges", Oberlin College, June 9-10, 1985.

were already participating in activities that lead to the renewal and maintenance of intellectual vigor, which is a goal of UFEP. We must recognize that even these relatively more active faculty members are in need of the recognition and stimulation of the workshops. However, greater effort must be made to attract participants from the group of faculty members with a lower level of professional activity who can benefit much more from the stimulation of a workshop. On balance, we believe that a mix of experiences, activity levels, and institutional types can lead to the best workshops.

Although the participant demographics reveal that minority and women participants were more heavily represented in the workshops than in the population of academic scientists, engineers, and mathematicians, there is still substantial room for improvement in this regard. An examination of the demographics of the United States shows a decreasing percentage of the white males traditionally attracted to careers in the sciences, mathematics, and engineering. The scientific professions must, therefore, be able to draw an increasing percentage of women and minorities in order to "attract an increasing fraction of the Nation's most talented students to careers in engineering, mathematics, and the sciences."[4] Minority and female scientists, mathematicians, and engineers play a crucial role in this endeavor and must be given all possible support.

There are a number of possible explanations for the lack of participation of minorities and women. They tend to be employed at resource-poor institutions, such as some community colleges.[5] Access to the workshops may be limited by the cost of traveling to the workshop, since travel costs are not allowed under current program guidelines; institutional reward systems may not place high value on these activities; or information about the projects may not be reaching these participants. Because of the importance of their inclusion in UFEP, these faculty members may need additional incentives to participate, such as increased stipends or travel funds.

Concerns about the effectiveness of recruitment to individual projects by project directors, and the dissemination of information about the program as a whole by NSF, deserve special comment. Project directors used a variety of methods to inform potential participants about their projects, including mailings to deans and chairs and direct mailings to participants themselves, and participants reported receiving information by these methods. There was a strong sense, supported by some anecdotal information from NSF, that direct mailings were the most effective of these methods. It is important that project directors have guidance about the most effective recruiting tools if minorities and women are to be reached.

By the same token, it is crucial that information about UFEP and its projects reach faculty members teaching undergraduate students in a timely fashion. Although NSF has consolidated information about programs in a brochure distributed widely, primarily to department chairs and deans, very few of the participants interviewed at professional

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[4]National Science Board. 1986. *Undergraduate Science, Mathematics and Engineering Education*. NSB 86-100. Washington, D.C.: NSB Task Committee on Undergraduate Science and Engineering Education.

[5]U.S. Department of Education. 1991. Digest of Education Statistics. NCES 91-697, Washington, D.C.: National Center for Education Statistics, Table 213.

society meetings had seen the brochure. Many of the participants expressed concern about the timing of the information they received about the program, and the probability that this poor timing had made the workshops inaccessible to certain faculty members. Professional society members from the various disciplines were not familiar with UFEP. Although nearly all UFEP workshops have been fully subscribed, low visibility of the program may contribute to a low rate of participation by faculty overall. If faculty members are aware of a program, they can begin to make plans to attend, even though details of specific projects may not be available at that time.

It also became apparent during the course of the evaluation that the data collected by the NSF UFE Program Office in project reports in the initial years of the program were of limited usefulness. The UFE Program Office has begun a more systematic collection of data relating to characteristics of program participants, but a broader, more continuous assessment of the effectiveness of the projects than can be performed from these demographic data is necessary to ensure that UFEP meets the needs of its targeted population.

The mechanics of the program operation were evaluated independently by a Committee of Visitors in June 1991, and that evaluation determined that the review process was effective and free of bias, and that the awards were appropriately balanced in regard to number versus size of awards, geographical distribution, and types of institutions.[6] According to NSF program officers, UFEP funds are allocated initially according to the percentage of undergraduate faculty members teaching in the various disciplines. Adjustments are then made based on the number and quality of proposals submitted, geographical and institutional distribution, and specific goals of NSF such as the responsibility to meet the needs of underrepresented minorities. The Committee of Visitors felt that the "funded projects reviewed reflected a probability of a large return in terms of undergraduate vitality for the money expended."

Recommendations

UFEP plays a crucial role in maintaining intellectual vigor in faculty members who teach undergraduate science, mathematics, and engineering courses, and in most disciplines is seen as one of the primary vehicles for faculty development and renewal. During the first 5 years of its existence, the program has reached between 5 and 10 percent of the approximately 162,000 faculty members in these disciplines,[7] including those reached through the ASEE and Chautauqua workshops, which are partially funded by UFEP. We recommend that NSF set a goal of reaching one-third of all faculty members teaching undergraduate courses in science, mathematics, and engineering within the next 3 years. This would require that substantial additional resources be made available for UFEP projects.

A crucial element in achieving this goal is to access a larger number of potential participants. A larger participant pool will be necessary, of course, if the number of projects funded increases to meet this target, but a larger participant pool is inherently desirable even now because of the potential for increasing the diversity of its members. To enable project

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[6]National Science Foundation. 1991. Committee of Visitors Report, Undergraduate Faculty Enhancement Program.

[7]U.S. Department of Education. 1991. Digest of Education Statistics. NCES 91-697, Washington, D.C.: National Center for Education Statistics, Table 214.

directors to more effectively target potential participants, we recommend that NSF develop a project director's handbook that would include guidelines and suggestions for participant recruitment and selection. This might include suggestions on how to recruit and select faculty members who are less professionally active, as well as women and minority faculty members. The handbook should also contain suggestions from previous project directors that will maximize the effectiveness of the workshop, such as techniques for ensuring that participant expertise matches the level of the course, followup activities that create a network of expertise among the participants, and assessment procedures that allow the project director and NSF to assess accurately the effectiveness of the workshop.

We recommend that participation by targeted groups be enhanced by encouraging more regional workshops, so that travel costs become less of a burden. Workshops that are regional in nature can also be targeted to areas of the country in which there are large concentrations of faculty members of underrepresented groups, since their geographic distribution is not uniform. Certain types of projects may be hosted at a variety of locations, thus maximizing access to the workshops. Currently, program directors are unable to use UFEP funds to support travel. We recommend that this restriction be lifted in certain cases. Although a number of the participants felt that travel funds from NSF would have greatly enhanced access, we feel that decisions about awarding funds, such as those for travel, are best left to the discretion of the program director.

We recommend that NSF take a more active role in enhancing the visibility of UFEP, that they market the program as a whole and make sure that the projects are seen as a part of the whole. One method of accomplishing this would be to require project directors to mention UFEP by name in their recruiting materials. As part of this effort, we recommend that the UFEP staff aggressively seek involvement with other NSF programs, such as the Instructional and Laboratory Instrumentation (ILI) and Undergraduate Course and Curriculum Development (UCCD) programs, as well as the research directorates, by using UFEP as a means for disseminating the results of these programs wherever possible. Coordination between programs is a highly desirable method of maximizing the effectiveness of all programs.

We encourage the development of closer ties between UFEP and the professional societies, in part as a mechanism for enhancing UFEP's visibility. In addition, NSF should ask the appropriate professional societies, through their committees on education/training, to take an active role in the solicitation of proposals from their members in order to help ensure that the needs of each discipline are met in terms of topic areas funded.

We recommend that the program description be modified to include explicitly the improvement of introductory courses among the areas that may be funded, but we do not recommend that the prohibition of projects of a purely pedagogical nature be dropped. We believe that the primary focus of UFEP should be on the intellectual activity in the discipline rather than predominantly on the methodology of teaching.

In order to maximize the benefit of the effort spent in developing workshops, we recommend that multiyear projects be encouraged. Multiyear funding will normally come at the expense of new projects

with new content. It is important that a balance be struck in this area, perhaps by a cap on the number of multiyear projects. In addition, we reiterate our encouragement to NSF that the Foundation develop additional means for assessing the effectiveness of the workshops as they expand the number of multiyear projects. It might be appropriate to evaluate the projects nominated for multiyear funding before a second year's funding is awarded. The mode of assessment should be at the discretion of the program directors, but might include site visits as a method for obtaining evaluation by participants.

Although we appreciate the desire by many of the representatives of the disciplines to encourage greater participation by faculty members at the premier research institutions as UFEP project directors and instructors, we are not convinced that this would make the workshops more effective. Faculty members involved in the instruction of undergraduate students may require an understanding of a research area at a very different level than that of the preeminent researchers in the field. It is also not always true that the most effective researcher is the most effective teacher.

Summary

UFEP plays a unique role in the effort of NSF to improve undergraduate education in science, mathematics, and engineering. More so than any other program, it is targeted at the vast majority of faculty members involved in undergraduate education, those who are primarily involved in teaching and for whom professional development opportunities are limited. It is obviously a highly successful program, and we join with the Committee of Visitors in supporting its growth as an important part of the Foundation's overall effort to improve the quality of undergraduate teaching in science, mathematics, and engineering.

INTRODUCTION

Background

The Undergraduate Faculty Enhancement Program (UFEP) was developed by the National Science Foundation (NSF) to meet the needs of faculty members who teach undergraduate students. NSF recognizes that while theoretical and experimental research has been flourishing and widening the scope of scientific disciplines, the concepts and instrumentation developed in these advances are difficult to implant in undergraduate education. Faculty members most closely associated with undergraduate teaching often have limited opportunities to become familiar with new concepts and have limited access to the laboratory resources of the advanced research community. This is especially true for faculty members located in institutions other than major research universities. These faculty members need help in gaining access to the new developments and instrumentation, as well as knowledge of how these developments and instrumentation may be incorporated into undergraduate courses and laboratories. They also need opportunities to interact with colleagues and experts in the field. UFEP was designed by NSF to provide these opportunities for undergraduate teaching faculty.

Under UFEP, NSF makes grants to project directors at colleges and universities, professional societies, industry, and other qualified organizations to conduct regional or national seminars, short courses, workshops, conferences, or similar activities for groups of faculty members in the sciences, mathematics, and engineering. These activities must be designed explicitly for their capacity to enhance participants' teaching activities for undergraduate students. The emphasis of the project must be on the active involvement of the participants in working with the topic of the project and in interaction with experts in the field and with fellow participants. Workshop sessions may vary in length, from a few days to a few weeks.

According to the UFEP Program Announcement and Guidelines for projects beginning in 1989 (NSF 88-33), the kinds of activities that are encouraged include projects that

- Allow participants to gain experience with recent developments in the field;
- Enable participants to work with innovative technologies relevant to their academic responsibilities and which allow them to evaluate the technology;
- Permit participants to work with experts who have had a part in originating the ideas that are the subject of the project or who have worked extensively with the ideas or techniques;
- Allow participants to work with scientists, mathematicians, and engineers who work in industry and to learn new industrial applications in the field;
- Permit participants to obtain personal experience working with new ideas and techniques, rather than just hearing about them;
- Encourage participants to develop instructional materials that include new ideas and techniques;

- Explore new methods of delivering information, such as the use of computers or teleconferencing, either in work with other participants during the project or in participants' activities after the project;
- Encourage sustained interaction among the participants following the project and continued opportunities for learning about the topics of the project; and
- Encourage the increased participation of underrepresented groups in the sciences, mathematics, and engineering.

Assessment of the Undergraduate Faculty Enhancement Program

In September 1990, NSF awarded a contract to Westat, Inc., of Rockville, Maryland, to assess the effectiveness of UFEP during its first 3 years of operation. This included projects conducted during 1988, 1989, and 1990. This report presents the principal findings based on data collected through mail questionnaires completed by eligible UFEP project directors, and telephone interviews conducted with participants in UFEP projects. Data from the participant interviews are weighted to represent the universe of UFEP participants.

As specified by NSF, the main purposes of the assessment were as follows:

- To provide descriptive information about the UFEP program and participant characteristics;
- To determine how faculty members who participated in UFEP rated the value and usefulness of the experience; and
- To determine the extent to which the participants used the knowledge and technical skills they had acquired, and what other influences the project had on their professional lives.

Assessment Advisory Committee

An Assessment Advisory Committee, composed of five academic scientists representing the major disciplines covered in UFEP plus two widely known specialists in program assessment in educational settings, was appointed to provide assistance in the design of the assessment, the development of the questionnaires, and the interpretation and presentation of the findings.

The Advisory Committee was also asked to review the assessment findings and to write the interpretive overview of UFEP that appears at the front of this report. Additional information for this interpretive overview was obtained during visits to professional society meetings that grew out of the Advisory Committee's concern that feedback about UFEP be obtained from members of the disciplines who do not have direct personal involvement with UFEP. The Advisory Committee was interested in evaluating the effect of UFEP within the larger context of the disciplines, seeking to answer the general question of whether UFEP was meeting the needs of the disciplines. Discussions with these disciplinary groups focused on the following issues:

- Is NSF funding appropriate topics in the field? Are there more important topics that are not being funded?
- Are UFEP projects structured appropriately?

- Is UFEP duplicating programs available elsewhere? Should NSF be spending its education money for faculty development in other ways?

Professional society meetings were attended by a Westat staff member, the Advisory Committee member for that discipline (or his representative, in one case), and a staff member from the NSF Division of Undergraduate Education, who could provide additional information about UFEP if needed. Meetings were held with members of the following groups. (It should be noted that participation of members of these groups does not represent an official opinion or evaluation of UFEP by these committees or the professional societies of which they are a part.)

- Chemistry: American Chemical Society Committee on Professional Training
- Engineering: Selected engineering deans and associate deans involved with undergraduate education, held during the annual conference of the American Society for Engineering Education
- Mathematics: Mathematical Association of America Faculty Development Committee
- Physics: American Physical Society Committee on Education and American Association of Physics Teachers Committee on Physics in Undergraduate Education

Arrangements could not be made for a meeting with an appropriate group representing the field of biology. In lieu of a meeting at a professional society conference, a group of biologists representing the diverse subareas of the discipline was convened in Washington, DC, for a discussion of UFEP biology projects.

Overview of the Assessment Process

Data for this assessment were collected in fall 1991 through questionnaires mailed to UFEP project directors and telephone interviews conducted with participants in UFEP projects. A copy of each of the questionnaires is included in Appendix C.

Questionnaires were completed by directors of 91 out of the 92 eligible projects. Projects were eligible for the survey if the UFEP grant was received in FY 1988, 1989, or 1990, and at least one of the project sessions took place prior to January 1, 1991. The 92 eligible projects were headed by 82 different project directors; 10 project directors received 2 grants each. However, since the unit of response for these questionnaires is the project, rather than the person, responses to all items on this questionnaire are based on the 91 eligible projects with completed questionnaires.

Certain atypical projects were excluded from the main data collection. Excluded were four conferences to which UFEP contributed funds, one faculty-mentor project, and the very large projects conducted by the American Society for Engineering Education and the National Chautauqua Workshop Program. These two large projects were excluded because their size and variability would have allocated too much of the participant sample to these projects and reduced the

precision of the estimates based on participant responses. Each of the excluded projects is discussed in Appendix A of this report.

Sampling for the participant telephone interviews was based on lists of participants supplied by the UFEP project directors. These lists were edited to identify two things: (1) whether each participant was from a 2-year or 4-year school, and (2) whether each participant was from an Historically Black College or University (HBCU). As part of the edit process, ineligible participants were removed from the lists. These included participants from colleges outside the United States, those from precollege level institutions (such as a high school), and those who were not from an academic institution. Eligible participants were then sorted into strata based on the number of participants in a project and the length of the workshop sessions. Within each stratum, participants were sorted by project discipline. Participants from 2-year colleges and HBCUs were placed in separate strata so that they could be sampled at higher rates to ensure that they were adequately represented in the study. A systematic sample of 500 participants was then selected with equal probability of selection within each stratum.

Completed telephone interviews were obtained with 469 of the 485 eligible participants, for a 97 percent response rate. The 15 people removed from the list of 500 sampled participants were those identified during data collection as having been on the participant lists in error, usually because they had not actually participated in the workshop or were project staff rather than participants. Data were weighted to reflect the universe of project participants, and adjusted for questionnaire nonresponse. Additional information about sampling and the standard errors for selected statistics are included in Appendix B.

During the professional society meetings, discussion sessions were also held with groups of faculty members who had been participants in UFEP projects. Discussions with participants focused on issues such as their successes and problems in using and implementing what they had learned at the project when they returned to their home institution; the strong and weak points of the projects (e.g., length, type of activities, followups after the workshop ended); and suggestions for NSF to improve UFEP in the future. Insights from these discussions with participants are included in the interpretive overview and conclusion sections of this report.

OVERVIEW OF UFEP

Projects Supported by UFEP

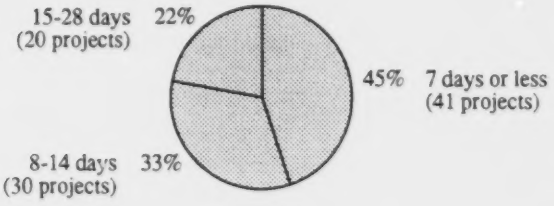
During the first 3 years of operation (FY 1988 - FY 1990), the Undergraduate Faculty Enhancement Program awarded approximately $6.7 million to 92 UFEP projects, each of which supported one or more workshops or short courses serving an estimated 2,890 participants. Project directors and participants from these workshops and short courses were the respondents to the questionnaire for project directors and the participant interview that form the basis for this report.

UFEP also contributed $127,100 toward 4 conferences, which were attended by about 1,150 people, and $61,400 toward a Faculty-Mentor project for 9 faculty members run by the American Society for Microbiology. In addition, UFEP contributed approximately $1.1 million in operating funds to the American Society for Engineering Education Faculty Professional Development Program and the National Chautauqua Workshop Program for courses in 1988-90, which together served about 3,400 people. These projects are described in Appendix A.

UFEP Workshops and Short Courses

Workshops and short courses varied substantially in length, ranging from a few days to 4 weeks. Figure 2-1 shows the number and percentage of projects in each category of workshop duration. Almost half of the projects had workshops that lasted 1 week or less (most of these were 5 days or 1 week); about one-third of the projects had workshops that lasted between 1 and 2 weeks (a couple of projects were 10 days, and most were 2 weeks); and the remaining 22 percent of projects had workshops that lasted more than 2 weeks (ranging from 17 days to 4 weeks). Projects with workshops of these lengths served 65 percent, 22 percent, and 13 percent of the participants, respectively.

Figure 2-1. Percentage and number of projects by workshop duration

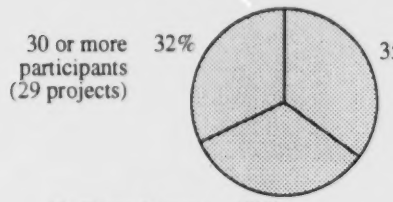


NOTE: The total number of projects represented here is 91. In addition, there was one project in the "7 days or less" category about which no information was collected, because one project director declined to complete the questionnaire.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Projects also served varying numbers of participants; a few projects had fewer than 10 participants, while a couple of larger multiyear projects served 200-300 participants each through multiple workshops and short courses. Figure 2-2 shows the number and percentage of projects in each category of total number of project participants. About one-third of the projects were in each of the categories of fewer than 20 participants, 20-29 participants, and 30 or more participants.

Figure 2-2. Percentage and number of projects by total number of project participants

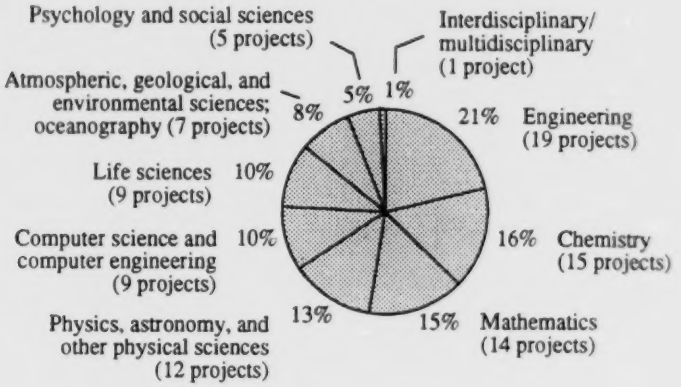


NOTE: The total number of projects represented here is 91. In addition, there was one project in the "30 or more participants" category about which no information was collected, because one project director declined to complete the questionnaire.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Figure 2-3 shows the distribution of projects across disciplinary groupings, created by grouping projects based on the NSF discipline code for the project that the project director selected at the time of proposal submission. Engineering was the most heavily represented discipline -- one in five projects was an engineering project. Chemistry, mathematics, and the category of "physics, astronomy, and other physical sciences" were also well represented among the projects. There was only one interdisciplinary/ multidisciplinary project, making conclusions about the nature of this kind of project impossible to separate from the nature of this one project. Because the number of projects in many of these disciplinary groupings is small, and the variation within groupings is sometimes large (e.g., atmospheric, geological, and environmental sciences, and oceanography), caution should be exercised in drawing conclusions about disciplinary groupings.

Figure 2-3. Percentage and number of projects by disciplinary grouping of projects



NOTES: The total number of projects represented here is 91. In addition, there was one project in psychology about which no information was collected, because one project director declined to complete the questionnaire. Because of rounding, percentages may not add to 100.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

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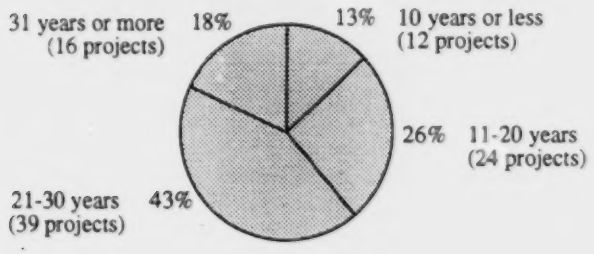
Description of UFEP Project Directors

The description of the UFEP project directors is based on the responses of the directors of 91 out of 92 projects who completed the project director's questionnaire. These 91 responses represent 81 different people; 10 project directors received 2 different awards each.

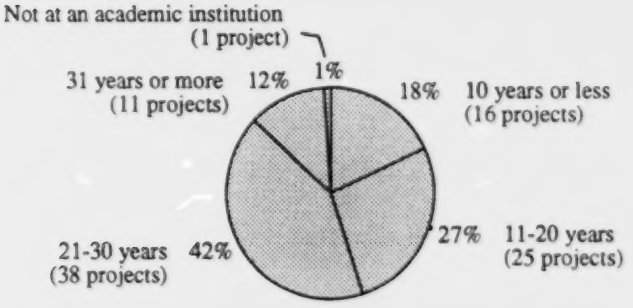
Almost all (96 percent) of the projects had directors whose highest degree was a doctorate; the remaining 4 percent held a master's degree. Directors of more than half (61 percent) of the projects received their highest degree more than 20 years ago (Figure 2-4); directors of another 13 percent of projects received their degree 10 or less years ago. About half (54 percent) of the projects had a director with more than 20 years of experience as a faculty member in higher education (Figure 2-5). The directors of 97 percent of the projects were at the same institution in fall 1991 (when the questionnaire was completed) where they had been when they submitted their first successful proposal to UFEP.

Figure 2-4. Percentage of projects by number of years since project director received his/her highest degree



SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

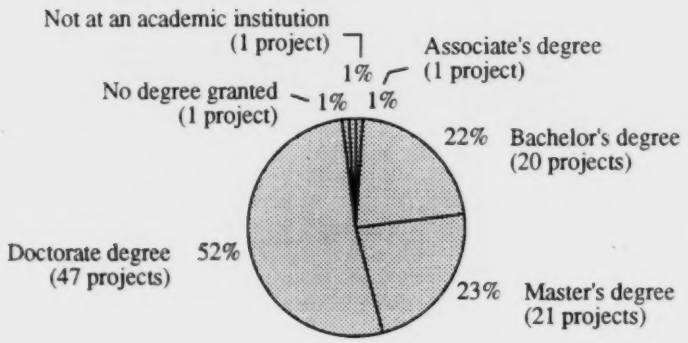
Figure 2-5. Percentage of projects by total number of years project director has been a faculty member in higher education



SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

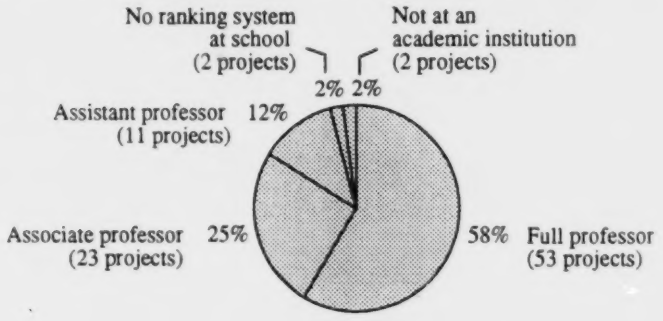
About half (52 percent) of the projects were headed by directors that came from departments where the highest degree granted was a doctorate (Figure 2-6). About a quarter (23 percent) of the projects had directors from departments where the highest degree granted was a master's degree. Thus, three-quarters of the projects were headed by directors from departments awarding graduate degrees. More than half (58 percent) of the projects had directors that were full professors (Figure 2-7), and 76 percent had directors that were tenured faculty members (Figure 2-8). All of the projects were headed by U.S. citizens or permanent U.S. residents. Directors of 88 percent of the projects were white, non-Hispanic (Figure 2-9), and 89 percent of the projects were headed by males.

Figure 2-6. Percentage of projects by highest degree granted in project director's department



SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

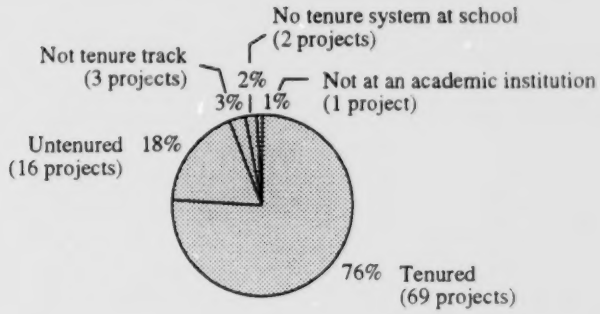
Figure 2-7. Percentage of projects by faculty rank of project director



NOTE: Because of rounding, percentages may not add to 100.

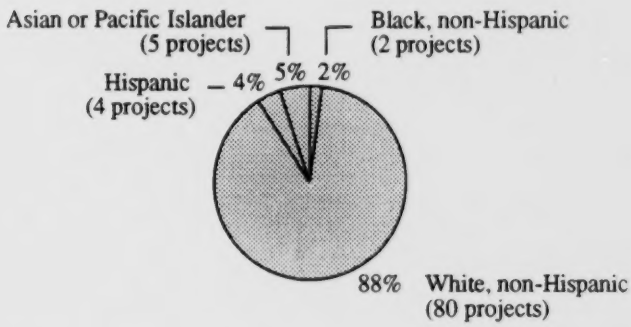
SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Figure 2-8. Percentage of projects by tenure status of project director



SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Figure 2-9. Percentage of projects by racial/ethnic category of project director



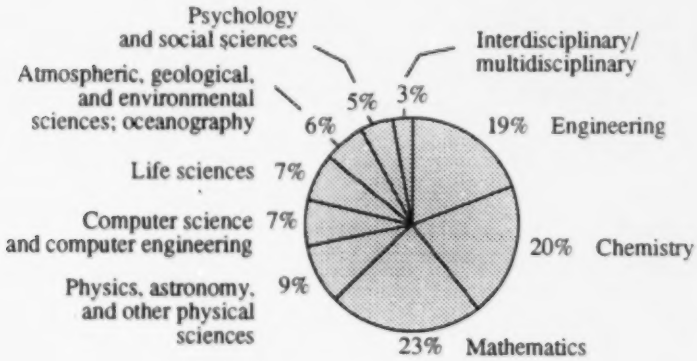
NOTE: Because of rounding, percentages may not add to 100.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Description of UFEP Participants

Of the estimated 2,890 participants attending the 92 UFEP workshops and short courses, 82 percent were from 4-year colleges and universities, and 18 percent were from 2-year and community colleges. Faculty from Historically Black Colleges and Universities constituted 6 percent of the UFEP participants (they were only about 2 percent of all science and engineering faculty nationwide). Participants were clustered in projects representing three disciplines. Almost a quarter (23 percent) of the participants attended mathematics projects, 20 percent attended chemistry projects, and 19 percent attended engineering projects (Figure 2-10).

Figure 2-10. Percentage of participants by discipline of project

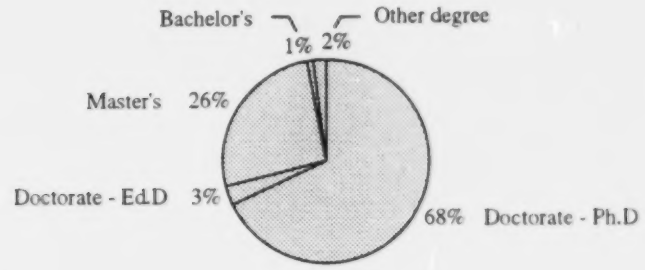


NOTE: Because of rounding, percentages may not add to 100.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

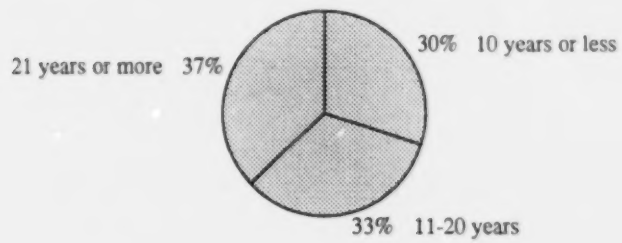
Almost three-quarters (71 percent) of participants held a doctorate as their highest degree; 26 percent held a master's degree as their highest degree (Figure 2-11). Slightly more than a third (37 percent) of participants had received their highest degree more than 20 years ago; 30 percent had received their highest degree 10 or less years ago (Figure 2-12). Similar proportions of faculty were reporting in these categories for the total number of years as a faculty member in higher education -- 39 percent had been a faculty member for more than 20 years, and 29 percent, for 10 or less years (Figure 2-13).

Figure 2-11. Percentage of participants by type of highest degree earned



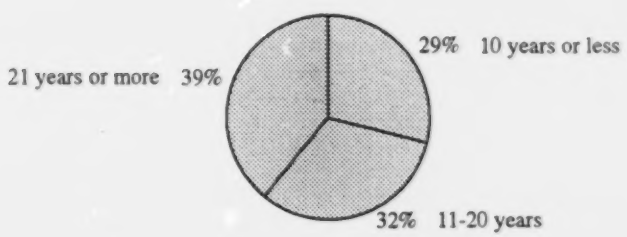
SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Figure 2-12. Percentage of participants by number of years since receiving their highest degree



SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Figure 2-13. Percentage of participants by total number of years as a faculty member in higher education



SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

The vast majority of participants (92 percent) remained at the same institution in fall 1991 (when the interview was conducted) where they had been when they attended the faculty project. At the time they participated in the faculty project, 31 percent had been on the faculty of the institution where they were teaching at that time for 5 or less years; 30 percent, for 6-15 years; and 39 percent, for more than 15 years. At the time they attended the faculty project, 24 percent of participants were teaching mathematics, 22 percent were teaching chemistry, and 21 percent were teaching engineering (Table 2-1). These percentages mirror the disciplines of the projects, since most faculty attended projects in the discipline they were teaching. Except for engineering, mathematics, and sociology, participants tended to come from institutions where there were 10 or fewer other full-time faculty teaching in their discipline.

Table 2-1.—Percentage of participants teaching each discipline at the time they attended the faculty project, and the percentage of those participants with the indicated range of other full-time faculty teaching in the same discipline at their institution

Discipline taught	Percentage teaching discipline[1]	Percentage with each number of other full-time faculty teaching that discipline[2]			
		0	1-5	6-10	More than 10
Astronomy	(+)	100	0	0	0
Biology	9	3	47	30	20
Chemistry	22	8	58	19	16
Computer science	8	4	64	20	12
Engineering[3]	21	0	9	5	86
Geology	2	11	38	51	0
Mathematics	24	0	20	30	50
Physics	9	5	64	24	7
Psychology	2	0	27	60	13
Sociology	2	0	37	26	37
Other discipline	8	10	44	16	30

(+) Less than 0.5.

[1]Percents add to more than 100 because respondents could indicate that they were teaching more than one discipline.

[2]Percents are based on those respondents who indicated that they were teaching that discipline.

[3]The number of all faculty teaching engineering was collected across all divisions or departments of engineering (e.g., chemical engineering, electrical engineering, mechanical engineering).

NOTE: Because of rounding, percentages may not add to 100.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

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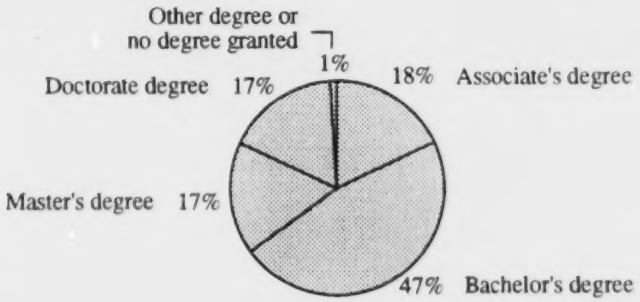
Almost half (47 percent) of the participants came from departments where the highest degree granted was a bachelor's degree (Figure 2-14). About a third (34 percent) came from departments that granted a graduate degree. These percentages are reflected in the percentage of participants who had taught various levels of courses during the last 3 years; 34 percent had taught graduate level courses and 75 percent, upper division undergraduate courses (Table 2-2). Most participants (89 percent) had taught introductory courses.

Figure 2-14. Percentage of participants by highest degree granted in participant's department



SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table 2-2.—Percentage of participants who have taught each level of courses during the last 3 years

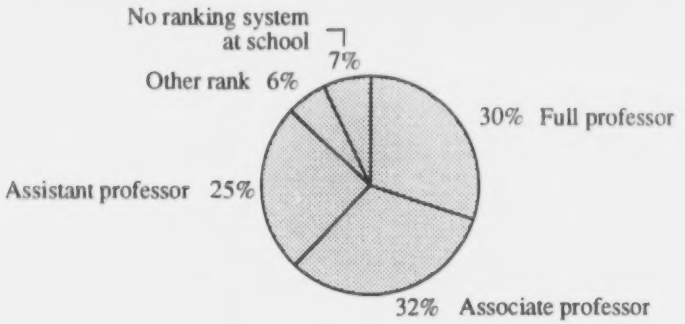
Level of courses taught	Percentage of participants
Introductory courses	89
Other lower division courses	80
Upper division courses	75
Graduate level courses	34

NOTE: Percentages add to more than 100 because respondents could indicate more than one level of course taught.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

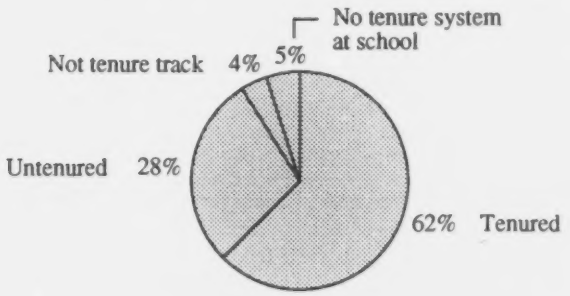
About a third (30 percent) of participants were full professors, and about a third (32 percent) were associate professors (Figure 2-15). Almost two-thirds (62 percent) were tenured faculty members (Figure 2-16). Almost all (99 percent) of the participants were U.S. citizens or permanent U.S. residents, and most (85 percent) were white, non-Hispanic (Figure 2-17). More than three-quarters (79 percent) of participants were male.

Figure 2-15. Percentage of participants by faculty rank



SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

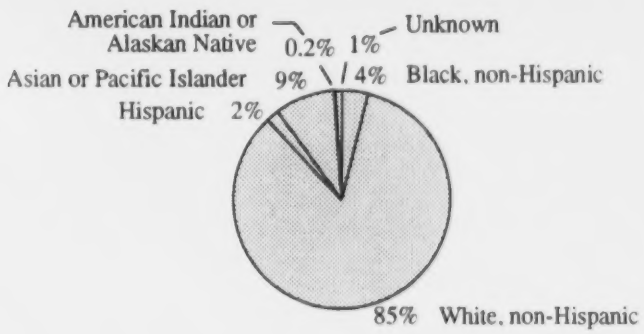
Figure 2-16. Percentage of participants by tenure status



NOTE: Because of rounding, percentages may not add to 100.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Figure 2-17. Percentage of participants by racial/ethnic group



NOTE: Because of rounding, percentages may not add to 100.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

PROJECT CHARACTERISTICS AND ACTIVITIES

Information on project characteristics and activities was provided by the project directors of 91 out of the 92 eligible UFEP projects. The project directors were the primary source for this information, since the NSF project files contained detailed information about the proposed activities, but little uniform information about the final implementation of the projects. The mail questionnaire (see Appendix C) asked project directors for information on project support and staffing, participant recruitment and selection, activities during workshop sessions, followup activities and continuing contacts with participants, and workshop assessments and evaluations. Project directors were also asked to report about their involvement with similar project activities, the feedback they received from their institution regarding their direction of a UFEP project, the extent to which they believed they derived certain benefits from the UFEP project they directed, and the extent to which they believed that the participants in their projects had derived these same benefits. Demographic information about project directors was also collected.

Additional Financial or In-Kind Support

Project directors were asked whether they sought financial or in-kind support for the project from additional sources besides NSF. They were instructed to include support sought from their institution, except for excluding equipment or facilities supplied by their institution as part of its indirect costs. The directors of slightly less than half of the projects (39 out of 91) sought additional financial or in-kind support (Table 3-1). Except for one, the directors of all projects that sought financial or in-kind support received such support. Examples of the kind of support received included the host university covering the cost of computer time for participants during the project, donated chemicals, the loan of computer workstations during the workshop sessions, the use of off-site facilities, and direct financial contributions by industry and foundations to cover project costs.

Table 3-1.—Number of projects for which directors sought financial or in-kind support for the project from additional sources besides NSF, by project characteristics

Project characteristic	Number of projects
Total	39
Workshop duration	
7 days or less	15
8-14 days	14
15-28 days	10
Discipline of project	
Engineering	7
Chemistry	12
Mathematics	2
Physics, astronomy, and other physical sciences	7
Computer science and computer engineering	4
Life sciences	4
Atmospheric, geological, and environmental sciences; oceanography	3
Psychology and social sciences	0
Interdisciplinary/multidisciplinary	0

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Project Staffing

Most projects used other members of the project director's institution as part of their project staff (Table 3-2). Among the 77 projects in this group, 67 projects used other faculty members as project staff; other categories, such as graduate students, were used less frequently.

Table 3-2.—Number of projects in which other members of the project director's institution served as project staff, and the number of projects using each type of institutional staff member as project staff

Project staff	Number of projects
Other members of institution served as project staff	77
Type of institutional staff members who served as project staff*	
Faculty members	67
Postdoctoral fellows	8
Graduate students	38
Undergraduate students	30
Other staff	22

*These numbers add to more than 77 projects because project directors could indicate that more than one type of institutional staff member served as project staff.

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

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More than half of the projects (54 out of 91) had project staff that came from outside the project director's institution (Table 3-3). The use of project staff from outside the project director's institution increased with a larger total number of project participants and higher level of degree granted in the project director's department. There was also considerable variability by project discipline. The most frequent source of these additional project staff was other colleges and universities, used by 45 projects (Table 3-4). People from industry were used as project staff by 17 projects; 15 projects used people from professional organizations or societies and 12 projects used people from government agencies as project staff.

Table 3-3.—Number of projects with any project staff from outside the project director's institution, by project characteristics

Project characteristic	Number of projects
Total	54
Workshop duration	
7 days or less	23
8-14 days	18
15-28 days	13
Total number of project participants	
Less than 20	16
20-29	18
30 or more	20
Discipline of project	
Engineering	11
Chemistry	6
Mathematics	10
Physics, astronomy, and other physical sciences	7
Computer science and computer engineering	3
Life sciences	7
Atmospheric, geological, and environmental sciences; oceanography	5
Psychology and social sciences	5
Interdisciplinary/multidisciplinary	0
Highest degree granted in project director's department*	
Bachelor's degree	10
Master's degree	11
Doctorate degree	30

*In addition, the director of one project came from a department that granted associate's degrees, one came from a department that did not grant degrees, and one was not from an academic institution.

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table 3-4.—Number of projects with project staff from outside the project director's institution, and the number of projects that had staff from each type of location

Project staff	Number of projects
Project staff came from outside the project director's institution	54
Location from which project staff came*	
Other colleges and universities	45
Government agencies	12
Professional organizations or societies	15
Industry	17
Other location	2

*Numbers add to more than 54 because project directors could indicate that staff came from more than one location.

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Participant Recruitment and Selection

Project directors in UFEP are free to recruit and select participants in the ways they see as most appropriate, as long as they follow the general guidelines established by NSF. According to the UFEP Program Announcement and Guidelines for projects beginning in summer 1989, the program is intended for those whose primary duties are in undergraduate teaching, participants should have a minimum of 3 years of undergraduate teaching experience by the beginning of the project, participants must be drawn from a regional or national audience, and a project should accommodate enough participants to enable it to have an impact on the teaching of a subject and to allow for diversity in the group of participants -- 10 was the suggested minimum number of participants. Project directors are instructed to "publicize their project's availability widely to the intended audience."

The most frequently used recruitment strategy, used by the directors of 71 projects, was to send program announcements to department chairs or deans and to ask them to bring the program to the attention of faculty members who might want to participate (Table 3-5). Other frequently used strategies were sending posters or brochures for posting in departments and placing announcements in newsletters or journals, both used by the directors of 51 projects.

Table 3-5.—Number of projects in which directors used various recruitment strategies to recruit participants

Form of participant recruitment	Number of projects
Sent program announcements to department chairs or deans, and asked them to bring program to the attention of faculty who might want to participate	71
Sent posters or brochures for posting in departments	51
Announcements in newsletters or journals	51
Direct mailings to members of professional organizations	35
Sent program announcements to departments for distribution to all faculty	33
Other recruitment strategy	19

NOTE: The total number of projects in the study is 91. These numbers add to more than 91 because project directors could indicate more than one form of project recruitment.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Project directors were asked to indicate whether they limited their recruitment efforts in various ways. The most frequent limitations on recruitment efforts were based on the characteristics of participants, with the directors of 69 projects limiting recruitment in this way (Table 3-6). Among these 69 projects, the directors of 48 projects indicated that they limited their recruitment efforts to faculty members teaching in certain fields or certain courses, and the directors of 26 projects wrote in that they limited recruitment to full-time faculty members (Table 3-7).

Table 3-6.—Number of projects in which directors limited their recruitment efforts in various ways

Limits on recruitment	Number of projects
Characteristics of participants[1]	69
Type of college[2]	38
Geographic region	33
Only faculty with letters of support from department chairs or deans	31
Only faculty nominated by department chairs or deans	3

[1]See Table 3-7 for information about the participant characteristics used.

[2]See Table 3-8 for information about the type of college used.

NOTE: The total number of projects in the study is 91. These numbers add to more than 91 because project directors could indicate more than one limit on recruitment.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table 3-7.—Number of projects in which directors limited their recruitment efforts based on various characteristics of the participants

Characteristic of participants on which recruitment limitation was based	Number of projects
Only faculty teaching in certain fields or certain courses	48
Only full-time faculty	26
Only faculty with a minimum number of years of experience or rank	10
Only faculty without a degree (or previous training) in the target field	3
Other	2

NOTE: The total number of projects in the study is 91; this table is based on the 69 projects for which project directors indicated that they limited recruitment based on the characteristics of participants. The numbers in this table add to more than 69 because project directors could indicate more than one characteristic of participants on which recruitment limitation was based.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

The type of college was a limitation on recruitment for directors of 38 projects (Table 3-6). Among these 38 projects, the directors of 16 projects indicated that they limited their recruitment to only 4-year colleges, and the directors of 6 projects noted that they limited their recruitment to only 2-year colleges (Table 3-8). Another focus of limitation based on the type of college was to limit recruitment to only colleges not awarding a doctorate or only colleges without (or with a very small) graduate program in the field.

Table 3-8.—Number of projects in which directors limited their recruitment efforts based on various types of colleges

Type of college on which recruitment limitation was based	Number of projects
Only 4-year colleges	16
Only 2-year colleges	6
Only colleges not awarding a doctorate (in field or at all)	7
Only colleges without (or with a very small) graduate program in field	5
Only colleges with certain kinds of programs or departments	5
Other	4

NOTE: The total number of projects in the study is 91; this table is based on the 38 projects for which project directors indicated that they limited recruitment based on the type of college. The numbers in this table add to more than 38 because project directors could indicate more than one type of college on which recruitment limitation was based.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Project directors were asked what problems, if any, they encountered in the recruitment process, and what they would do differently another time. The responses to these open-ended questions were then coded into categories. Although nearly all UFEP projects have been fully subscribed, the directors of almost half of the projects (40 out of 91) said they encountered problems of some sort in the recruitment process (Table 3-9). This varied by the year the project began, ranging from 7 projects in 1988 to 20 projects in 1989. Among the 40 projects that encountered problems in the recruitment process, the directors of 12 projects indicated that late notification of their award by NSF created problems for the project (e.g., many potential faculty participants had already made their summer plans). Late notification by NSF was a problem for directors of five projects in 1988, four projects in 1989, and three projects in 1990.

Table 3-9.—Number of projects in which directors encountered problems in the recruitment process, and the type of problem encountered, by year project began

Recruitment problem	Total	Year project began		
		1988	1989	1990
Encountered problems in recruitment	40	7	20	13
Type of problem encountered*				
Late notification by NSF	12	5	4	3
Too few applications received, lack of interest	8	1	5	2
Timing of project	5	1	3	1
Other problems	22	2	12	8

*These numbers add to more than the number of projects that indicate that they encountered problems in the recruitment process because project directors could indicate more than one type of problem.

NOTE: The total number of projects in the study is 91; 23 projects began in 1988, 39 in 1989, and 29 in 1990.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

The only other problems mentioned more than a few times were receiving too few applications or a lack of interest on the part of the target audience and the timing of the project, mentioned by directors of eight and five projects, respectively. Most problems mentioned were idiosyncratic to a particular project.

The directors of about a third of the projects indicated that they would do something differently in the recruitment process another time (Table 3-10). Among the 27 projects in this group, the directors of 12 projects indicated that they would advertise or announce their workshops earlier, and 5 would advertise their workshops more widely. No other changes in recruitment strategy were mentioned with any frequency, reflecting the diversity of problems encountered.

Table 3-10.—Number of projects in which directors would do something differently in the recruitment process another time, and what they would do differently

Recruitment process	Number of projects
Would do something differently in the recruitment process another time	27
What would be done differently*	
Advertise or announce workshops earlier	12
Advertise workshop more widely	5
Other	18

*These numbers add to more than 27 projects because project directors could indicate more than one different approach.

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Project directors were asked whether they tried to increase the number of applications received from members of various target groups. Directors of 65 of the projects indicated that they targeted one or more groups for recruitment. The directors of more than half of the projects (54 out of 91) tried to increase the number of minority faculty who applied, and the directors of 44 projects tried to increase the number of women applicants (Table 3-11). Faculty members from 2-year institutions were targeted by directors of 22 projects; directors of 5 projects targeted faculty members with physical disabilities.

Table 3-11.—Number of projects in which directors targeted one or more groups of faculty for recruitment, and the number in which each of the various groups of faculty were targeted for recruitment

Recruitment targeting	Number of projects
Targeted one or more groups of faculty for recruitment	65
Target groups for recruitment*	
Minority faculty	54
Women faculty	44
Faculty from 2-year institutions	22
Faculty with physical disabilities	5
Other faculty groups	8

*These numbers add to more than 65 projects because project directors could indicate that they targeted more than one group for recruitment.

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

The most common recruitment approach used by project directors who tried to increase the number of applications received from various specific groups was to target mailings or recruitment to certain kinds of faculties or schools; directors of 43 projects used this approach (Table 3-12). Another common approach, used by directors of 21 projects, was to target certain groups of faculty in advertising or application materials, using methods such as including a statement that applications from these groups are encouraged. The only other approach mentioned frequently was direct contacts (e.g., calls or visits) to department chairs or others at a school. These responses are all based on an open-ended question that was then coded into various categories.

Table 3-12.—Number of projects in which directors used various recruitment approaches for targeting groups of faculty

Recruitment approach for target groups	Number of projects
By targeting mailings or recruitment to certain kinds of faculties or schools	43
In advertising or application materials (e.g., statement that applications from these groups are encouraged)	21
Direct contact (e.g., calls, visits) to department chairs or others at a school	12
By limiting recruitment to certain kinds of institutions (e.g., only 2-year colleges or high minority enrollment colleges)	4
Other approach	6

NOTE: The total number of projects in the study is 91; this table is based on the 65 projects that targeted one or more groups of faculty for recruitment. The numbers in this table add to more than 65 because project directors could indicate more than one recruitment approach for target groups.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Project directors were asked to indicate the criteria they used to select participants from among those who applied. The responses to this open-ended question were then coded into categories, shown in Table 3-13. The directors of about half of the projects mentioned that their selection criteria included (a) the types of undergraduate courses taught or the program needs at the institution (48 projects); and (b) a statement of purpose, likelihood of using the material, or a demonstrated interest in the area (45 projects). The directors of about a third of the projects said their selection criteria included (a) giving preference to minority or women faculty (34 projects); and (b) giving preference to applicants with letters of support, or whose home institution would pay their travel costs (29 projects). The directors of about a fourth of the projects had selection criteria that included (a) type of academic background or skill, such as knowing a computer language (21 projects); and (b) type/background as a faculty member, such as only full-time faculty, nontenured faculty, or those who received their degree more than some specified number of years ago (20 projects). The remaining categories of selection criteria were mentioned less frequently.

Table 3-13.—Number of projects in which directors used various selection criteria for participants

Selection criteria	Number of projects
Types of undergraduate courses taught, or program needs at the institution	48
Statement of purpose, likelihood of using material, demonstrated interest in area	45
Preference to minority or women faculty	34
Preference to applicants with letters of support, or whose home institution would pay travel costs	29
Type of academic background or skill (e.g., must know computer language)	21
Type/background as a faculty member (e.g., full-time faculty, at least 3 years teaching experience, nontenured faculty, received degree more than specified number of years ago)	20
Preference to applicants from certain types of institutions (e.g., 2-year, 4-year, minority colleges)	12
Selection to provide wide or national geographic distribution	12
Preference to particular geographic region or consortium membership	9
Selection to provide diverse distribution of types of institutions (e.g., some doctorate-granting, some baccalaureate, some 2-year colleges)	9
Limitations on the number of participants from an institution	7
First come, first served	7
Other criteria	10

NOTE: The total number of projects in the study is 91. These numbers add to more than 91 because project directors could use more than one selection criterion.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Prior Preparation by Participants

The directors of 31 of the projects required (or strongly encouraged) preparation by participants prior to their arrival at the workshop (Table 3-14). Among those projects that did require or encourage preparation, the only form of preparation that was mentioned frequently on this open-ended item was reading background material, textbooks, or lab manuals, required by directors of 24 projects.

Table 3-14.—Number of projects in which directors required (or strongly encouraged) prior preparation by participants, and the form that prior preparation took

Project preparation	Number of projects
Project required (or strongly encouraged) preparation by participants prior to their arrival	31
Form of prior preparation*	
Reading background material, textbooks, lab manuals	24
Completing a questionnaire to assess skill level, interests, teaching responsibilities, objectives	5
Identification/development of a course or ways to incorporate project information at the home institution	4
Preparing a project or problem to work on during the workshop	3
Other activities	2

*These numbers add to more than 31 projects because project directors could specify more than one form of prior preparation.

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Activities During Workshop Sessions

Almost all projects included lectures or seminars (90 projects) and laboratory or computer sessions (82 projects) during their workshop sessions (Table 3-15). Other activities that many projects used were small discussion groups (67 projects), participant presentations (54 projects), and participant projects (49 projects). Project directors were also asked to select up to three activities that made up the major workshop activities from the list provided. The activities most frequently mentioned as "top three" activities were lectures or seminars (81 projects), laboratory or computer sessions (73 projects), participant projects (31 projects), and small discussion groups (29 projects).

Table 3-15.—Number of projects that included various kinds of activities during project sessions, and the number of projects in which directors indicated that these activities were one of up to three major activities during the sessions

Activity	Activity included during project sessions	Activity was 1 of up to 3 major activities during sessions
Lecture/seminar	90	81
Laboratory or computer sessions	82	73
Small discussion groups	67	29
Participant presentations	54	10
Participant projects	49	31
Visiting a field site for demonstration purposes (e.g., laboratory or industrial plant tours)	36	10
Field-based activity (e.g., collecting specimens, setting up instruments, collecting observational data)	9	5
Other activities	19	10

NOTE: The total number of projects in the study is 91. These numbers add to more than 91 in each column because project directors could indicate more than one activity.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Workshop Assessments and Evaluations

The directors of almost all projects (89 out of 91) asked their participants to evaluate the workshop sessions (Table 3-16). This evaluation was most frequently done after the workshop was over, but before the participants returned home. The directors of most projects (82 out of 91) also asked their participants to assess the usefulness or value of project participation to their undergraduate teaching responsibilities at their home institutions. The two most common times at which this assessment was performed were when the workshop was over but before the participants returned home, and after the participants returned home. Directors of 59 of the projects assessed the knowledge and skill of participants; this assessment was most frequently performed before the workshop began or at the beginning of the workshop. Thus, the directors of most projects did engage in evaluation activities of some kind. However, since the information collected by project directors during these evaluations was not standardized, and the information was generally not reported to NSF in any usable fashion (if at all), it was not possible to integrate these evaluations into the overall project assessment.

Table 3-16.—Number of projects in which various kinds of assessments or evaluations were done, and the times at which those assessments or evaluations were done

Kinds of assessment or evaluation	Did this kind of assessment or evaluation	Time of assessment or evaluation*			
		Before workshop began or at the beginning of the workshop	During the workshop	After the workshop was over, but before the participants returned home	After the participants returned home
Knowledge and skills of participants	59	51	9	15	5
Attitudes of participants toward undergraduate teaching	44	29	13	15	8
Evaluation by participants of the workshop sessions	89	5	20	79	28
Usefulness or value of project participation to participants' undergraduate teaching responsibilities at their home institutions	82	8	14	55	43
Other kinds	14	2	1	5	7

*Numbers in each row are based on projects that did that kind of assessment or evaluation. The numbers in each row add to more than the number of projects that did that kind of assessment or evaluation because each type of assessment or evaluation could be done at more than one point in time.

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

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Followup Activities

Almost all projects (89 out of 91) had followup activities or continuing contacts of some kind with project participants. As shown in Table 3-17, the most frequent followup activities were sharing materials among participants (58 projects), continuing technical assistance to participants (55 projects), written reports from participants sent to the project director (49 projects), and informal group get-togethers (48 projects). Only 23 projects had followup activities that involved formal group sessions at scheduled times as a continuing part of the project.

Table 3-17.—Number of projects that had various kinds of followup activities associated with them

Project followup activity	Number of projects
Sharing materials among participants	58
Continuing technical assistance to participants	55
Written reports from participants sent to the project director	49
Informal group get togethers (e.g., at professional meetings)	48
Participant presentations at professional meetings	36
Establishment of computer or other communication networks with participants	27
Formal group sessions at scheduled times, as a continuing part of the project (e.g., a reunion symposium that participants are obligated to attend)	23
Visits by the project director to participants at their home institutions	22
Newsletter prepared by participants and/or the project director	19
Other followup activity	14

NOTE: The total number of projects in the study is 91; this table is based on the 89 projects that had followup activities of some kind. The numbers in this table add to more than 89 because projects could have more than one type of followup activity associated with them.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

For 60 of the 91 projects, project directors indicated that the followup activities actually associated with their projects were the same as those described in their proposal. Where changes were made, they usually involved the addition of activities or contacts, such as informal group get-togethers or participant presentations at professional meetings, or a slight change in the nature of activities, such as using electronic mail to communicate rather than formal written reports.

Project directors were asked what changes, if any, they would make in the followup activities if they were to do the project again. Directors of 47 projects indicated that they would not make any changes in their followup activities. Changes that were mentioned by the others included adding (or formalizing the use of) electronic networks or newsletters to communicate, adding followup sessions for the group, and more actively encouraging participant presentations at professional meetings. Several project directors also mentioned that the followup activities they conducted involved more time, effort, and money than they had anticipated.

Directors of 35 of the projects were planning to conduct additional followup activities in the future. The more recently a project had taken place, the more likely it was that the project director was planning additional followup activities, ranging from 5 of the 1988 projects to 16 of the 1990 projects.

Involvement with Similar Project Activities

For 46 of the projects, this project was not the first time the project director had run or been involved with organizing a program of this sort. Directors of 53 of the projects indicated that they had run or been involved in organizing similar programs since conducting this project. The directors of 79 of the projects indicated that, in the future, they planned to run this or a similar project designed to meet the needs of faculty who teach undergraduate students. Thus, many of the faculty who directed the UFEP projects have experience with these kinds of programs, and most hope to continue to provide these professional development programs in the future.

Feedback from the Institution

Project directors were asked about the kinds of feedback, both positive and negative, they received from their institution regarding their direction of a faculty enhancement program; the directors of 76 projects received some kind of feedback from their institution. The feedback that was received was almost entirely positive; only two project directors, representing three projects, indicated that they received negative feedback, and one of those project directors received substantial positive feedback as well. As shown in Table 3-18, the directors of 65 projects received positive feedback about the recognition such a program could bring to their institution, the directors of 62 projects received positive feedback about their role in running such a program, and the directors of 59 projects received encouragement to apply for other such programs in the future. Of course, it is possible that potential project directors who received negative feedback from their institution about conducting a faculty enhancement program never submitted proposals to UFEP.

Table 3-18.—Number of projects in which directors received feedback from their institution about directing a faculty enhancement project, and the type of feedback received

Feedback received	Number of projects
Feedback received	76
Type of feedback received*	
Positive feedback about the recognition such a program can bring to this institution	65
Positive feedback about your role in running such a program	62
Encouragement to apply for other such programs in the future	59
Positive feedback about the effect such a program has on the undergraduate teaching at this institution	26
Negative feedback about the effects running such a program will have on your career	2
Negative feedback concerning the use of institutional or departmental resources	1
Attempts to discourage applications to direct such programs in the future	0
Other feedback	8

*These numbers add to more than 76 projects because project directors could receive more than one type of feedback.

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Impact on Project Directors

Project directors were asked to indicate the extent to which they believe they derived certain benefits from the faculty enhancement project they directed. Ratings were made on a 5-point scale, with 1 being "not at all" and 5 being "very much." Table 3-19 shows the ratings of these possible benefits. Benefits that received the highest ratings were increased contacts with colleagues from other institutions, given a 4 or 5 rating by the directors of 79 of the projects, and increased motivation or stimulation for teaching excellence, given a 4 or 5 rating by the directors of 69 of the projects. Other benefits receiving high ratings were personal growth or renewal, and new perspectives on teaching and learning.

Table 3-19.—Number of projects in which directors indicated the extent to which they received various benefits from the faculty enhancement project they directed

Possible benefits	Extent of perceived benefit rated on 5-point scale					
	(1) Not at all	(2)	(3)	(4)	(5) Very much	Not ascertained
Increased knowledge of the field	8	14	24	20	23	2
New perspectives on teaching and learning	6	7	21	38	18	1
Knowledge about and skill in using new instructional procedures, materials, or equipment	9	12	30	22	17	1
Personal growth or renewal	4	7	18	35	25	2
Information about other resources for use in teaching	7	15	36	21	11	1
Increased contacts with colleagues from other institutions	0	3	8	11	68	1
Increased scholarly activity	18	8	26	20	17	2
Increased motivation or stimulation for teaching excellence	2	5	14	32	37	1

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Assessment of the Impact on Participants

Project directors were also asked to indicate the extent to which they believed that the participants in their projects derived certain benefits from their participation. The same list of possible benefits and the same 5-point scale was used that the project directors used to rate the benefits for themselves, and that participants used to rate the benefits for themselves during their telephone interview.

Table 3-20 shows the project directors' ratings of possible benefits to their participants. It is interesting to note how high these ratings are. Increased knowledge of the field was given a 4 or 5 rating by the directors of 83 of the projects; increased contacts with colleagues from other institutions received a 4 or 5 rating from the directors of 80 of the projects. With the exception of increased scholarly activity, the other possible benefits received ratings of 4 or 5 from directors of more than half of the 91 projects. Project directors obviously believe that the participants in their projects are reaping a multitude of benefits from their participation.

Table 3-20.—Number of projects in which directors indicated the extent to which they believed the project participants received various benefits from the faculty project they attended

Possible benefits	Extent of perceived benefit rated on 5-point scale					
	(1) Not at all	(2)	(3)	(4)	(5) Very much	Not ascertained
Increased knowledge of the field. . . .	0	1	7	18	65	0
New perspectives on teaching and learning.	0	8	21	27	35	0
Knowledge about and skill in using new instructional procedures, materials, or equipment.	0	8	13	28	42	0
Personal growth or renewal	3	4	19	40	22	3
Information about other resources for use in teaching.	0	15	21	28	25	2
Increased contacts with colleagues from other institutions	0	5	6	23	57	0
Increased scholarly activity	8	19	28	17	18	1
Increased motivation or stimulation for teaching excellence	2	2	20	33	33	1

NOTE: The total number of projects in the study is 91.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

PARTICIPANT INFORMATION AND OUTCOMES

Information was sought from UFEP participants to determine how they rated the value and usefulness of the experience, and to determine the extent to which the participants used their acquired knowledge and technical skills. Telephone interviews (see Appendix C) were conducted with 469 participants from the 92 eligible UFEP projects. Data from the participant interviews were weighted to represent the universe of 1988-90 UFEP participants, estimated to be 2,890. The telephone interviews asked participants how they learned about the UFEP project they attended, institutional support for project attendance and aid in implementing what they had learned, and followup activities and contacts with project directors and other project participants. Participants were also asked to indicate how valuable or worthwhile various project activities and resources were to them, rate the usefulness for teaching and research activities of new technologies to which they were introduced, and indicate the extent to which they derived certain benefits from their participation in the faculty project. In addition, participants were asked about whether they had engaged in various activities since returning from the UFEP project, and to what extent their experience at the faculty project influenced what they had done. Demographic information about participants was also collected.

Learning About Faculty Projects

Participants learned about the faculty projects they attended in a variety of ways. As shown in Table 4-1, the most frequent means by which participants learned about the project was through a flyer, poster, or letter put up in the department or circulated by faculty mail (42 percent). Other important sources of information about the projects were direct mailings received by the participant (23 percent), and learning about it in a journal or newsletter, or at a professional meeting (19 percent).

Table 4-1.—Percentage of participants reporting various sources of information as the way they learned about the faculty project they attended

Form of project publicity	Percentage of participants
Flyer, poster, or letter put up in department or circulated by faculty mail	42
Direct mailing received by participant	23
Learned about it in a journal or newsletter, or at a professional meeting	19
Other faculty member or colleague told participant about it	12
Dean or department chair told participant about it	8
Learned about it some other way	2

NOTE: Percentages add to more than 100 because respondents could indicate more than one way of learning about a project.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Travel to Faculty Projects

The issue of who paid the travel costs of the participant to the faculty project is of interest since the UFEP program guidelines indicate that the home institution of the participant is expected to bear travel costs to the project. This is one way that institutional administrators can demonstrate their support for their faculty's participation in such programs. However, only 64 percent of participants indicated that their home institutions or department paid for their travel; 22 percent of participants paid for travel themselves (Table 4-2). Interestingly, over one-fifth of participants from HBCUs indicated that NSF or the UFEP project paid for their travel. Since UFEP project funds provided by NSF cannot be used to pay for travel to the UFEP workshops, it may be that the stipends paid by some projects were used for travel costs by participants whose home institutions were not paying for travel.

Table 4-2.—Percentage of participants reporting various sources of travel funding to the faculty project they attended, by level and type of participants' school

Source of travel funds	Total	School level		School type	
		2-year	4-year	HBCU*	Non-HBCU
Home institution or department paid	64	57	66	53	65
Participant paid	22	26	22	26	22
NSF or the project paid	11	14	10	21	10
Some other organization or institution paid	1	1	1	4	1
Travel paid in some other way	3	1	3	3	3

*HBCU stands for Historically Black Colleges and Universities.

NOTE: Percentages may add to more than 100 because respondents could indicate more than one source of funds for travel to the project. An additional 7 percent of respondents indicated that this question was not applicable to them because project-associated travel was inconsequential or not necessary.

See Table B-1 for the number of participants by each classification variable.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Institutional Support for Faculty Attendance

In addition to paying travel costs, department chairs or deans could demonstrate interest and support for their faculty's participation in other ways. Most participants felt that their department chair or dean showed substantial interest in their participation at the faculty project, with approximately three-quarters of the participants indicating that their department chair or dean expressed a great or moderate degree of interest both before and after their attendance at the UFEP workshop (Table 4-3). While only 14 percent of participants indicated that their department chair or dean had made a large degree of commitment about purchasing equipment or instructional material related to the project prior to their attendance at the faculty workshop, 55 percent of participants indicated that after they returned from the faculty project, they or their department chair or dean purchased, or applied to purchase, equipment or instructional materials related to the project they attended.

Table 4-3.—Percentage of participants reporting various degrees of interest shown by their department chair or dean in their attendance at the faculty project

Extent of interest shown	Before attendance	After attendance
Great deal	44	39
Moderate degree	35	37
Slight degree	12	17
No interest	9	7

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Another way that department chairs or deans can demonstrate support for the attendance of their faculty at UFEP workshops is to provide assistance to aid in implementing what the participants learned at the project. Ways in which such assistance can be provided included release time, summer support, student teaching assistants, or other support staff. One-third (33 percent) of participants received one or more of these forms of assistance. Twelve percent of participants received release time or student teaching assistants, and 10 percent received assistance from other support staff (Table 4-4).

Table 4-4.—Percentage of participants indicating that their department chair or dean provided them with assistance in implementing what they learned at the faculty project and the type of assistance received, by school level

Assistance received	Total	School level	
		2-year	4-year
Received assistance from department chair or dean	33	28	34
Type of assistance received:*			
Release time	12	10	12
Summer support	7	6	8
Student teaching assistants	12	4	14
Other support staff	10	10	10
Other kinds of assistance	9	8	9

*Components add to more than totals because participants could indicate that they received more than one type of assistance from their department chair or dean.

NOTE: See Table B-1 for the number of participants by school level.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Followup Activities

Participants were asked to indicate whether there were any followup activities associated with the faculty project they attended, regardless of whether they participated in the followup activities. Approximately three-quarters of the participants indicated that such activities were associated with the project they attended (Table 4-5).

Table 4-5.—Percentage of participants indicating that there were followup activities associated with the faculty project they attended, and the percentage indicating that they had been in contact with the project director or other participants aside from any followup activities, by workshop duration

Project characteristic	Followup activities	Other project contacts
Total	74	62
Workshop duration		
7 days or less	71	56
8-14 days	79	72
15-28 days	84	74

NOTE: See Table B-1 for the number of participants by workshop duration.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

As shown in Table 4-6, most participants in projects with followup activities participated in at least some of those activities, and almost three-quarters of those who had participated in any followup activities participated in all such activities associated with their projects. Among nonparticipants, the most frequent reasons for not participating were that travel money was not available for attendance (48 percent), the followup activity was scheduled at an inconvenient time (46 percent), they were too busy to attend (44 percent), and the activity was scheduled at an inconvenient place (34 percent; Table 4-6). Participants were also asked whether they had been in contact with the project director or other participants, aside from any followup activities. Over 60 percent of participants indicated that they had engaged in additional project contacts (Table 4-5).

Table 4-6.—Percentage of participants indicating that they participated in followup activities associated with the faculty project they attended, and the reasons given for not participating in some or all of the followup activities, by workshop duration

Participation in activities	Total	Workshop duration		
		7 days or less	8-14 days	15-28 days
Participated in any followup activities[1]	88	89	83	90
Participated in all followup activities[2]	72	77	64	64
Reasons for not participating in followup activities[3]				
Thought would not benefit very much from participating	13	14	9	19
Activity was scheduled at an inconvenient time	46	38	58	51
Activity was scheduled at an inconvenient place	34	27	39	47
Too busy to attend	44	40	52	44
No travel money was available for attendance	48	38	53	68
The appropriate equipment was not available for participation	6	5	9	0
Other reasons	16	18	18	5

[1]Percentages are based on the number of participants who indicated that there were followup activities associated with their faculty project (n=2,139).

[2]Percentages are based on the number of participants who had participated in any of the followup activities associated with their faculty project (n=1,873).

[3]Percentages are based on the number of participants who did not participate in some or all of the followup activities associated with their faculty project (n=789). Percentages add to more than 100 because respondents could indicate more than one reason for not participating in followup activities.

NOTE: See Table B-1 for the number of participants by workshop duration.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Altogether, 91 percent of participants had either followup activities or other project contacts (some had both). The open-ended responses to the questions about types of followup activities and project contacts were coded into categories. Since the activities and contacts participants provided in response to both questions were similar in nature, the responses were analyzed jointly. Table 4-7 shows the percentage of participants reporting various kinds of followup activities or other project contacts. Over half of participants reporting followup activities or contacts indicated that they had engaged in correspondence or calls with the project director (52 percent), and that there had been meetings, conferences, get-togethers, or workshops with the project director or other participants (52 percent). Approximately a quarter of participants with followup activities or contacts reported receiving a newsletter (29 percent), engaging in correspondence or calls between participants (28 percent), and informal contacts with other participants or the project director (24 percent).

Table 4-7.—Percentage of participants reporting various kinds of followup activities or other project contacts

Type of followup activity or contact	Percentage of participants*
Correspondence or calls with the project director	52
Meetings, conferences, get-togethers, workshops	52
Newsletter	29
Correspondence or calls between participants	28
Informal contacts with other participants or the project director	24
Product received (e.g., computer software, workbook, project summaries	11
Proposals or projects conducted jointly with other participants or the project director	4
Evaluation forms or questionnaires sent by the project director	4
Visits or presentations between participants	3
Visits to host school to meet with project staff	1
Other activities	9

*Percentages are based on all participants who reported either followup activities or other project contacts (n=2,617, or 91% of participants).

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Participants were asked to indicate how valuable or worthwhile certain activities and resources associated with faculty projects were to them. The rating was done on a 5-point scale, with 1 being "not at all valuable or worthwhile" and 5 being "very valuable or worthwhile." Participants could also indicate that certain activities or resources were not applicable to their project.

Activities and resources associated with the faculty projects were generally perceived as being quite valuable or worthwhile (Table 4-8). Most noteworthy for their frequency (i.e., most projects had them) and their very high ratings are interactions with instructors, informal interactions with other participants, content of the lectures or seminars, hands-on learning activities, and materials to be taken back to their school. Participants from 2-year schools and those whose highest degree was less than a doctorate tended to rate these items as being particularly valuable or worthwhile (Table 4-9), although these numbers are not all statistically significantly different from each other.

Table 4-8.—Percentage of participants indicating how valuable or worthwhile various activities or resources were to them

Activity or resource	Perceived value rated on 5-point scale					Not applicable to project
	(1) Not at all valuable or worthwhile	(2)	(3)	(4)	(5) Very valuable or worthwhile	
Study materials sent before the session	4	6	11	13	17	50
Content of the lectures or seminars	(+)	4	11	36	50	--
Materials to be taken back to school	1	6	15	34	41	2
Hands-on learning activities	3	6	10	28	46	7
Interactions with the instructors	(+)	2	11	29	57	--
Informal interactions with other participants	1	2	12	34	51	1
Participant presentations	3	5	20	28	16	28
Library or computer software resources	3	10	16	25	20	27
Field trips	2	1	6	8	12	70
Followup activities*	8	9	19	21	14	26

(+) Less than 0.5.

-- Not applicable.

*An additional 3 percent of participants indicated that they had not participated in the followup activities associated with their project, and therefore could not judge their value.

NOTE: Because of rounding, percentages may add to more than 100.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program* National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table 4-9.—Percentage of participants indicating that selected activities or resources were very valuable or worthwhile to them, by level of participant's school and highest degree received

Activity or resource	Total	School level		Participant's highest degree	
		2-year	4-year	Less than doctorate	Doctorate
Content of the lectures or seminars	50	56	48	59	46
Materials to be taken back to school	41	48	39	41	41
Hands-on learning activities	46	52	45	48	46
Interactions with instructors	57	65	55	65	53
Informal interactions with other participants	51	57	50	61	47

NOTE: See Table B-1 for the number of participants by each classification variable.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Using the same 5-point scale, participants also indicated how valuable or worthwhile they thought the project was, overall. The perceived value of the projects was very high, with 45 percent of participants giving the project they attended a rating of 5 (very valuable or worthwhile), and an additional 40 percent of participants giving their project a rating of 4 (Table 4-10). Projects were perceived as particularly valuable by participants from 2-year schools, participants from departments where the highest degree granted was an associate's or bachelor's degree, and by participants with less than a doctorate. The perceived value of the projects for participants also increased with an increasing number of years since receiving their highest degree. Again, these numbers are not all statistically significantly different from each other.

Table 4-10.—Percentage of participants indicating how valuable or worthwhile the project was overall, by project, school, and participant characteristics

Project, school, or participant characteristic	Perceived value rated on 5-point scale				
	(1) Not at all valuable or worthwhile	(2)	(3)	(4)	(5) Very valuable or worthwhile
Total	1	4	9	40	45
Workshop duration					
7 days or less	2	5	9	41	43
8-14 days	0	3	9	40	49
15-28 days	2	2	14	32	49
Level of participant's school					
2-year	3	3	7	30	57
4-year	1	5	10	42	43
HBCU status of participant's institution[1]					
HBCU	1	0	7	47	44
Non-HBCU	1	5	10	39	45
Years since receiving highest degree					
10 years or less	(+)	8	11	42	38
11-20 years	3	3	10	40	45
21 or more years	1	3	7	37	52
Participant's highest degree					
Less than doctorate	1	4	6	37	51
Doctorate	1	4	11	41	43
Highest degree granted in participant's department[2]					
Associate's degree	3	3	7	32	55
Bachelor's degree	2	5	7	41	45
Master's degree	1	3	16	41	39
Doctorate degree	0	5	12	43	40

(+) Less than 0.5.

[1]HBCU stands for Historically Black Colleges and Universities.

[2]An additional 1 percent of participants indicated that their department granted some other kind of degree, or did not grant any degrees.

NOTE: See Table B-1 for the number of participants by each classification variable. Because of rounding, percentages may not add to 100.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Introduction and Usefulness of New Technologies

One kind of activity encouraged by UFEP are projects that involve new or innovative technologies relevant to undergraduate teaching responsibilities. Participants were asked whether they were introduced in the faculty project they attended to technologies that were new to them, or that they had never previously had a chance to try. More than three-quarters (78 percent) of participants indicated that their faculty project had involved such new technologies (Table 4-11). The likelihood of being introduced to new technologies increased with longer workshop duration.

Table 4-11.—Percentage of participants who were introduced to new technologies, and ratings of usefulness of those technologies to their undergraduate teaching responsibilities and research activities, by workshop duration

Introduction and usefulness of new technologies	Total	Workshop duration		
		7 days or less	8-14 days	15-28 days
Total	78	74	83	88
Usefulness of new technology to:*				
Undergraduate teaching				
Not at all useful	10	13	5	9
Somewhat useful	43	44	39	44
Very useful	47	44	57	47
Research activities				
Not at all useful	43	46	38	37
Somewhat useful	35	31	44	39
Very useful	22	23	17	24

*Percentages are based on the number of participants who said they were introduced to new technologies at the faculty project they attended.

NOTE: See Table B-1 for the number of participants by workshop duration.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Those participants who had been introduced to new technologies were asked to rate the usefulness or applicability of those new technologies to their undergraduate teaching responsibilities and to their research activities. Almost half (47 percent) of these participants found that the new technologies were very useful or applicable to their undergraduate teaching responsibilities, with an additional 43 percent indicating that the technologies were somewhat useful for their teaching (Table 4-11). As would be expected in a program such as UFEP, where the focus is on undergraduate teaching, far fewer participants found the new technologies to be useful or applicable to their research activities. Only 22 percent of these participants rated the technologies as very useful or applicable, and 43 percent rated them as not at all useful or applicable to their research activities.

Awareness of and Attendance at ASEE and Chautauqua Courses

As mentioned earlier in this report, UFEP contributes funding to the short courses for college faculty that are offered by the Chautauqua Centers and by the American Society for Engineering Education (ASEE), as well as funding the faculty projects that are the focus of this assessment. Participants in this assessment were asked whether they were aware of the short courses offered by Chautauqua and ASEE; 78 percent indicated that they were aware of these courses (Table 4-12). There was, however, substantial variability in awareness of these courses by the discipline of the project, ranging from 53 percent of participants in computer science and computer engineering projects to 92 percent of participants in physics, astronomy, and other physical sciences projects.

Table 4-12.—Percentage of participants who were aware of and had attended the short courses for college faculty offered by the Chautauqua Centers and the American Society for Engineering Education, by project discipline

Discipline of project	Aware of courses	Attended* courses
Total	78	40
Discipline of project		
Engineering	75	29
Chemistry	90	51
Mathematics	75	30
Physics, astronomy, and other physical sciences	92	41
Computer science and computer engineering	53	39
Life sciences	88	45
Atmospheric, geological, and environmental sciences; oceanography	73	53
Psychology and social sciences	63	38
Interdisciplinary/multidisciplinary	84	52

*Percentages are based on those who said they were aware of the courses.

NOTE: See Table B-1 for the number of participants by discipline of the project.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Participants who were aware of the Chautauqua and ASEE short courses were asked whether they had ever attended any of the courses; 40 percent of these participants had attended either Chautauqua or ASEE courses (Table 4-12). As with awareness of these courses, there was substantial variation in attendance by discipline of the project.

Perceived Benefits from Project Participation

Faculty members can benefit in a number of ways from participating in these faculty development projects. Participants were asked to indicate the extent to which they derived certain benefits from their participation, using a scale ranging from 1 to 5, with 1 being "not at all" and 5 being "very much." Table 4-13 shows the ratings of these possible benefits. Benefits that received the highest ratings were increased knowledge of the field, given a 4 or 5 rating by 76 percent of participants, personal growth or renewal and increased motivation or stimulation for teaching excellence, each given a 4 or 5 rating by 73 percent of participants, and increased contacts with colleagues from other institutions, given a 4 or 5 rating by 64 percent of participants.

Table 4-13.—Percentage of participants indicating the extent to which they received various benefits from their participation in the faculty project

Possible benefit	Extent of perceived benefit rated on 5-point scale				
	(1) Not at all	(2)	(3)	(4)	(5) Very much
Increased knowledge of the field	3	6	15	39	37
New perspectives on teaching and learning	4	8	27	35	25
Knowledge about and skill in using new instructional procedures, materials, or equipment	5	9	28	36	22
Personal growth or renewal	4	7	15	35	38
Information about other resources for use in teaching	6	7	29	37	22
Increased contacts with colleagues from other institutions	6	8	22	31	33
Increased scholarly activity	13	13	31	28	15
Increased motivation or stimulation for teaching excellence	4	7	17	35	38

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table 4-14 shows the percentage of participants that gave ratings of 5 ("very much") for selected benefits, broken out by various characteristics. As with the overall rating of project value, there was a tendency for the benefits to be perceived as greater by participants from 2-year colleges, participants whose highest degree was less than a doctorate, participants with more years since receiving their highest degree, and participants from departments where the highest degree awarded was below the graduate level, although again these numbers are not always statistically significantly different from each other.

Table 4-14.—Percentage of participants indicating that they received selected benefits to the greatest extent possible ("very much") from their participation in the faculty project, by project, school, and participant characteristics

Project, school, or participant characteristic	Increased knowledge of the field	Knowledge/ skill with new instructional procedures, materials, or equipment	Personal growth or renewal	Increased contacts with colleagues from other institutions
Total	37	22	38	33
Workshop duration				
7 days or less	35	25	34	34
8-14 days	43	16	46	26
15-28 days	38	13	47	40
Level of participant's school				
2-year	47	29	47	35
4-year	35	20	36	32
Years since receiving highest degree				
10 years or less	34	15	34	33
11-20 years	37	22	38	30
21 or more years	40	28	43	35
Participant's highest degree				
Less than doctorate	44	24	48	37
Doctorate	34	21	34	31
Highest degree granted in participant's department*				
Associate's degree	46	27	47	34
Bachelor's degree	40	22	40	35
Master's degree	28	17	33	30
Doctorate degree	28	21	30	26

*An additional 1 percent of participants indicated that their department granted some other kind of degree, or did not grant any degrees.

NOTE: See Table B-1 for the number of participants by each classification variable.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Some of the benefit ratings ascribed to the group of participants by the project directors were much higher than the ratings participants selected for themselves as individuals. Project directors in 91 percent of the projects (83 out of 91 projects) believed that participants in their projects received a high degree (ratings of 4 or 5) of increased knowledge of the field (see Table 3-20). Participants also believed that they received an increased knowledge of the field, but only 76 percent of participants gave this a rating of 4 or 5 (see Table 4-13). The same pattern holds for increased contacts with colleagues from other institutions, with directors of 88 percent of projects (80 out of 91 projects) giving this a rating of 4 or 5, and only 64 percent of participants giving this a 4 or 5 rating. This kind of pattern is also present for knowledge about and skill in using new instructional procedures, materials, or equipment, with directors of 77 percent of projects (70 out of 91 projects) giving this a rating of 4 or 5, as compared to only 58 percent of participants.

Professional Activities Prior to Project Attendance

Participants were asked whether they had engaged in various professional activities in the 3 years prior to their attendance at the faculty project. Most participants (93 percent) had attended professional meetings, seminars, or workshops, and this attendance did not vary by participant or school characteristics (Table 4-15). About two-thirds (63 percent) of participants had participated in formal programs designed to develop curriculum or improve instruction, and such participation was more likely for those whose highest degree was less than a doctorate. Fewer participants had delivered a paper at a professional meeting (57 percent) or submitted an article to a professional journal (47 percent). These latter activities (delivering a paper and submitting an article) were less likely to have been undertaken by participants from 2-year schools and those whose highest degree was less than a doctorate, and these activities became less likely with an increasing number of years since receiving the highest degree and a lower level of degree awarded in the participant's department.

Table 4-15.—Percentage of participants indicating that they had engaged in various professional activities in the 3 years prior to their attendance at the faculty project, by school and participant characteristics

School or participant characteristic	Attended any professional meetings, seminars, or workshops	Delivered a paper at a professional meeting	Submitted an article to a professional journal	Participated in formal programs designed to develop curriculum or improve instruction
Total	93	57	47	63
Level of participant's school				
2-year	92	29	16	73
4-year	93	64	54	61
Years since receiving highest degree				
10 years or less	93	72	64	50
11 - 20 years	95	53	43	72
21 or more years	93	49	36	66
Participant's highest degree				
Less than doctorate	91	36	20	75
Doctorate	94	66	58	59
Highest degree granted in participant's department*				
Associate's degree	92	28	16	73
Bachelor's degree	95	57	46	62
Master's degree	93	68	57	62
Doctorate degree	90	79	74	62

*An additional 1 percent of participants indicated that their department granted some other kind of degree, or did not grant any degrees.

NOTE: See Table B-1 for the number of participants by each classification variable.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

While the major aim of UFEP is to enhance faculty members in ways that will affect their undergraduate teaching, a secondary issue of interest is whether attendance at a faculty project leads to increased participation in professional activities of various sorts. Table 4-15 shows the percentage of participants who had engaged in various professional activities in the 3 years prior to their attendance at the faculty project, and Table 4-16 shows the percentage of participants who engaged in these same professional activities since returning from the faculty project. Inspection of these tables shows that the percentages are basically unchanged, suggesting that participation in these professional activities is not influenced much by participation in the UFEP faculty projects. Since the percentage of participants attending professional meetings, seminars, or workshops was already very high, there was little room for this activity to be influenced by attendance at a UFEP workshop. Professional activities such as delivering a paper at a professional meeting or submitting an article to a professional journal are not likely to be easily changed by brief interventions such as workshop

attendance. It is likely that these activities are more related to factors such as the presence of an active research program, teaching course-load, and perceived institutional rewards for engaging in these activities. However, as the discussion in the next section will illustrate, UFEP workshops were effective in changing course-related activities, which are more closely related to undergraduate teaching than are these professional activities.

Table 4-16.—Percentage of participants indicating that they engaged in various professional activities since returning from the faculty project, by school and participant characteristics

School or participant characteristic	Attended any professional meetings, seminars, or workshops	Delivered a paper at a professional meeting	Submitted an article to a professional journal	Participated in formal programs designed to develop curriculum or improve instruction
Total	95	53	43	63
Level of participant's school				
2-year	92	17	15	73
4-year	96	61	49	61
Years since receiving highest degree				
10 years or less	96	64	58	60
11-20 years	96	48	36	69
21 or more years	93	48	36	60
Participant's highest degree				
Less than doctorate	94	32	21	68
Doctorate	96	61	52	61
Highest degree granted in participant's department*				
Associate's degree	92	18	15	73
Bachelor's degree	95	52	40	60
Master's degree	96	75	58	60
Doctorate degree	98	70	67	66

*An additional 1 percent of participants indicated that their department granted some other kind of degree, or did not grant any degrees.

NOTE: See Table B-1 for the number of participants by each classification variable.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Faculty Activities Since Project Attendance

Participants were asked to indicate whether they had engaged in a variety of activities since returning from the faculty project, regardless of the relationships of those activities to the faculty project attended. For those activities in which a faculty member had engaged, they were asked to indicate the extent to which their experience at the faculty project influenced what they did. The activities were divided into categories that included course-related activities, interactions with students, interactions with faculty colleagues, and professional activities. The results are shown in Table 4-17.

Course-Related Activities

More than 80 percent of participants indicated that they had modified their teaching methods (81 percent), acquired new equipment, materials, or computer software for undergraduate courses or laboratories (86 percent), introduced new content into existing undergraduate courses or laboratories (93 percent), and incorporated equipment, materials, or computer software into undergraduate courses or laboratories in ways in which they had not previously been used (81 percent). In addition, a majority of participants developed new undergraduate courses or laboratories (62 percent) and participated in formal programs designed to develop curriculum or improve instruction (63 percent). With the exception of participation in curriculum development programs, most participants who had engaged in these course-related activities indicated that their activities had been moderately or strongly influenced by their experience at the UFEP project (Table 4-17).

Table 4-17.—Percentage of participants who engaged in various activities since returning from the faculty project, and the extent to which participation in these activities was influenced by their experience at the faculty project--continued on next page

Activity	Engaged in activity since returning	Extent influenced by experience at faculty project rated on 5-point scale*				
		(1) Not at all	(2)	(3)	(4)	(5) Very much
Course-related						
Modified your teaching methods	81	11	11	34	30	14
Acquired new equipment, materials, or computer software for undergraduate courses or laboratories	86	17	11	23	24	25
Developed new undergraduate courses or laboratories	62	21	10	24	21	24
Introduced new content into existing undergraduate courses or laboratories	93	10	12	24	31	24
Incorporated equipment, materials, or computer software into undergraduate courses or laboratories in ways in which they had not previously been used	81	14	12	21	32	22
Participated in formal programs designed to develop curriculum or improve instruction	63	32	12	24	23	10
Interactions with students						
Been involved with a research program for undergraduates	46	38	15	18	18	11
Arranged for undergraduate student field trips or site visits	44	43	16	21	10	9
Arranged for guest experts to come to the school for undergraduate seminars or demonstrations	56	40	14	23	14	9
Developed new or continued existing links with graduate faculty, government agencies, or industry that will benefit undergraduate students	62	33	17	21	19	10
Been involved with a student club or seminar series for undergraduates in your department or discipline	64	46	15	17	16	6
Encouraged and assisted undergraduate students with presentations at scientific meetings	44	37	16	21	15	11
Interactions with faculty colleagues						
Shared with colleagues new materials or skills you have acquired	92	9	10	26	32	23
Established new research or teaching collaborations with colleagues	62	23	10	29	20	19
Established new or continued existing usage of computer or other communication networks for communication with colleagues	55	26	9	31	22	12

Table 4-17.—Percent of participants who had engaged in various activities since returning from the faculty project, and the extent to which participation in these activities was influenced by their experience at the faculty project--continued from previous page

Activity	Engaged in activity since returning	Extent influenced by experience at faculty project rated on 5-point scale*				
		(1) Not at all	(2)	(3)	(4)	(5) Very much
Professional activities						
Attended professional meetings, seminars, or workshops	95	40	13	23	14	10
Delivered a paper at a professional meeting	53	47	9	19	13	12
Made a presentation to a local campus or community organization	62	44	11	18	15	13
Submitted an article to a professional journal	43	56	10	13	11	9
Initiated or expanded a research program	50	38	9	16	20	18
Served on boards, committees, or review panels of professional societies	41	50	12	18	12	9
Gained competence in a new area of your own or another discipline	81	16	9	21	29	25

*Percentages are based on those who said they had engaged in that activity since returning from the faculty project they attended.

NOTE: See Table B-1 for the number of participants by each classification variable. Because of rounding, percentages may not add to 100.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table 4-18 provides information on these course-related activities broken out by workshop duration. Workshop duration does not appear to influence these course-related activities in any systematic fashion, either in terms of likelihood of engaging in the activities, or the extent to which the project influenced these activities. What is not known, of course, is the extent to which workshop duration influenced the amount of new content or equipment incorporated into classes and laboratories.

Table 4-18.—Percentage of participants who engaged in various course-related activities since returning from the faculty project, and the extent to which these activities were strongly influenced (ratings of "4" or "5") by their experience at the faculty project, by workshop duration

Course-related activities	Total	Workshop duration		
		7 days or less	8-14 days	15-28 days
Modified teaching methods				
Engaged in activity	81	82	78	82
Strongly influenced*	44	44	42	43
Acquired new equipment, materials, or computer software for undergraduate courses or labs				
Engaged in activity	86	89	81	80
Strongly influenced*	48	50	50	38
Developed new undergraduate courses or labs				
Engaged in activity	62	60	68	61
Strongly influenced*	45	41	54	45
Introduced new content into existing undergraduate courses or labs				
Engaged in activity	93	93	95	88
Strongly influenced*	55	53	54	62
Incorporated equipment, materials or computer software into undergraduate courses or labs in new ways				
Engaged in activity	81	83	85	64
Strongly influenced*	54	52	57	58

*Percentages are based on those who said they had engaged in that activity since returning from the faculty project they attended.

NOTE: See Table B-1 for the number of participants by workshop duration.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

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Interactions with Students

Participants were less likely to have engaged in the specific interactions with students listed in Table 4-17 than they were to have engaged in the course-related activities described in the table. The only items in this section in which a majority of the participants engaged were arranging for guest experts to come to the school for undergraduate seminars or demonstrations (56 percent), developing new or continuing existing links with graduate faculty, government agencies, or industry that will benefit undergraduate students (62 percent), and involvement with a student club or seminar series for undergraduates (64 percent). None of the activities in this section were strongly influenced by participation in the faculty project.

Interactions with Faculty Colleagues

Most participants (92 percent) indicated that they had shared with colleagues new materials or skills that they had acquired (Table 4-17). Most of the participants who had shared with colleagues in this way indicated that they had been moderately to strongly influenced by their experiences at the faculty enhancement project they attended. Participants were less likely to have engaged in the other activities in this section, and those participants who had engaged in the activities did not see them as being strongly influenced by their experiences at the faculty enhancement project.

Professional Activities

Almost all participants (95 percent) indicated that they had attended professional meetings, seminars, or workshops, and most (81 percent) indicated that they had gained competence in a new area of their own or another discipline (Table 4-17). Participants were less likely to have engaged in the remaining activities in this section. With the exception of gaining competence in a new area of their own or another discipline, participants who had engaged in these professional activities did not see them as being strongly influenced by their experiences at the faculty enhancement project they attended.

DISCUSSION AND CONCLUSIONS

The Undergraduate Faculty Enhancement Program appears to be fulfilling its mandate quite well: to assist undergraduate faculty members to learn new ideas and techniques in their fields and to use the knowledge and experience gained to improve their undergraduate teaching abilities. The project offerings have been enthusiastically received by faculty members, who indicate that they have received substantial benefits from the projects for themselves personally and for their teaching. The projects have provided exposure to new ideas and technologies, which have strongly influenced the introduction of new content and equipment into undergraduate courses. The projects are also reaching groups that have traditionally been underrepresented in the sciences, mathematics, and engineering, although there is room for improvement in this regard.

Program guidelines promote projects that encourage participants to develop instructional materials that include new ideas and techniques. While this was not measured directly, most participants indicated that, since returning from the faculty project, they had introduced new content into existing undergraduate courses or laboratories (93 percent); acquired new equipment, materials, or computer software for undergraduate courses or laboratories (86 percent); incorporated equipment, materials, or computer software into undergraduate courses or laboratories in ways in which they had not previously been used (81 percent); modified their teaching methods (81 percent); and developed new undergraduate courses or laboratories (62 percent). In addition, most participants (92 percent) indicated that they had shared with colleagues new materials or skills that they acquired. Participants indicated that these activities were moderately to strongly influenced by their participation in the faculty project.

The UFEP program guidelines also specify that projects should permit participants to obtain personal experience working with new ideas and techniques, rather than just hearing about them. UFEP projects were successful in this regard. Eighty-two projects (90 percent) included laboratory or computer sessions during the workshop, and 54 percent of projects included participant projects of some kind as a workshop activity. Three-quarters (74 percent) of participants rated the hands-on learning activities at the projects they attended as highly valuable or worthwhile.

UFEP program guidelines also encourage projects that enable participants to work with and evaluate innovative technologies relevant to their academic responsibilities. UFEP projects accomplished this quite well. Three-quarters (78 percent) of participants indicated that the project they attended introduced them to technologies that were new to them, or which they had never previously had a chance to try. Of the faculty introduced to new technologies, 90 percent rated these technologies as very or somewhat useful or applicable to their undergraduate teaching responsibilities. Projects that allow participants to work with industrial scientists, mathematicians, and engineers are also encouraged by the program guidelines; one in five UFEP projects used people from industry as part of their project staff.

Participants perceived the UFEP projects to have been highly beneficial. The overall evaluation of the project they attended was very high, with 85 percent of the participants indicating that the project was highly valuable or worthwhile. The activities or resources rated as most valuable or worthwhile were interactions with instructors, informal interactions with participants, content of the lectures and seminars, hands-on learning activities, and materials to be taken back to their school. The value of interactions with instructors and other participants came through especially strongly during the conversations with participants held at the professional society meetings. Repeatedly, participants said that the chance to interact with faculty colleagues was a very important part of the workshops, and that many of the good ideas about how to apply what they were learning in the workshops came from these colleagues. The intensive, residential nature of the workshops was highly beneficial in this regard.

The extent to which benefits were perceived to have been obtained through the project were particularly high for increased knowledge of the field, personal growth or renewal, increased motivation or stimulation for teaching excellence, and increased contacts with colleagues from other institutions. These benefits that the participants perceived they obtained from the project reflect the benefits NSF had in mind when it established UFEP: to have undergraduate teachers who are up to date in their knowledge, excited about their disciplines, and regard the teaching of undergraduates as important and rewarding.

UFEP served its intended target audience of "faculty who teach primarily undergraduate students" (UFEP Program Announcement and Guidelines for projects beginning in 1989). Almost half (47 percent) of the faculty participants were from academic departments where the highest degree granted was a bachelor's degree; an additional 18 percent of participants were from departments where the highest degree granted was an associate's degree. Almost all (89 percent) of the participants had recently taught introductory courses, and 75 percent had recently taught upper division undergraduate courses. Thus, the faculty served were indeed those who teach primarily undergraduate students. They were also relatively far from their graduate training -- over a third (37 percent) of participants had received their highest degree more than 20 years ago, and an additional one-third (33 percent) had received their degree 11-20 years ago. These faculty may be especially able to benefit from exposure to new theoretical developments and instrumentation.

UFEP also targeted and served groups that have been underrepresented in science, mathematics, and engineering, although there is room for improvement in this regard. According to the National Center for Education Statistics (*1991 Digest of Education Statistics*), underrepresented minorities (i.e., all minority groups except Asians) constituted 2 percent of engineering and 3 percent of natural sciences full-time regular instructional faculty in 1987-88; women constituted 2 percent of the engineering faculty and 17 percent of the natural sciences faculty. In UFEP, however, 6 percent of the faculty participants were from underrepresented racial or ethnic minority groups, and 21 percent were women. Faculty from Historically Black Colleges and Universities (HBCUs) constituted 6 percent of the UFEP participants, although they were only about 2 percent of science and engineering faculty nationwide. Faculty members from HBCUs attended 48 percent (44 out of 92) of the UFEP projects. Thus, underrepresented minority and women faculty participated in UFEP at a slightly greater rate than their rate of

employment as faculty members in science and engineering, and they were widely dispersed across the projects.

One point suggested by these data and reiterated by the participants during the sessions at professional society meetings was that the participants felt that they did not get much support from their administration for attending these workshops. While most participants believed that their department chair or dean showed substantial interest in their participation in the faculty project, this interest did not translate into comprehensive assistance in implementing what they had learned. While about half of the participants indicated that they or their department chair or dean had purchased, or applied to purchase, equipment or instructional materials related to the project they attended, few faculty received release time, summer support, or support staff to assist them. Developing new or changing existing courses or laboratories, researching new equipment purchases, and learning to use new equipment or changing the way current equipment is used were all done in addition to their regular faculty duties, which for many participants meant that changes were implemented more slowly than desired, and at substantial personal cost in time and effort. While some participants found their faculty colleagues eager to implement new ideas, others expressed frustration with the resistance to change they found among their colleagues. Some participants felt that the reward structures at their schools did not encourage professional development activities such as attendance at these workshops, and did not reward those faculty who sought to make changes or implement new ideas. Others indicated that their administration, especially their department chairs, did encourage and reward such activities. This encouragement, however, did not generally translate into comprehensive assistance with implementation, such as release time for new course development.

Another point that emerged from discussions with participants at the professional society meetings was that travel costs may present a problem for some participants and potential participants. While NSF expects that the home institution will pay travel costs for the participant, only 64 percent of participants had their travel paid in this way. Lack of travel funds was also the most frequently given reason for not attending followup activities. Discussions with participants revealed that for many, travel was limited to workshops within driving distance of their home institution, either because this was the only travel for which their department had funds, or because they were paying for the travel themselves. Some relied on the stipend they received from the project to help defray their travel expenses. Since the participants with whom these discussions were held were those who had managed to secure funding (or provide it themselves) to both the workshop and a professional society meeting, it is likely that travel funds were an issue for others, especially for potential participants who did not attend a workshop. For some faculty, lack of travel funds may act to deter participation, or at least to limit the choice of workshops in which participation is possible to those geographically close to the home institution.

Another point that emerged from the participant discussion sessions was that workshop length may be an important consideration for many participants and potential participants. While most participants felt that the workshop they attended was the right length for the amount of material covered (i.e., that the project directors had done a good job of matching length and content), many participants expressed a preference for 1-week workshops. While longer workshops may have some benefits

associated with them, such as being able to cover more material, these participants felt that longer workshops deter people from attending, especially those at community colleges (with extensive teaching assignments and year-round sessions) and those with family responsibilities. Short workshop sessions were the norm for these UFEP projects, with 45 percent of the projects having workshop sessions ranging from 5 days to 1 week. Thus, there seems to be a fairly good match in terms of workshop length between participant preference and workshop offerings.

It is also apparent that the dissemination of information by NSF about all available project offerings is not as effective as it could be. While almost all UFEP workshops were fully subscribed, if the program is to grow to meet the needs of a larger proportion of undergraduate faculty, timely information concerning UFEP projects must be more effectively disseminated. While NSF has recently developed a brochure listing UFEP projects that will be offered during a coming year, very few participants (or professional society committee members) had seen the brochure or knew of its existence for either 1991 or 1992 workshops (the 2 years for which the brochure has been available), even though NSF has mailed out about 30,000 of the 1992 brochures. Since each project director recruits participants individually, it is crucial that the only centralized source of information about projects be more effectively disseminated. One approach would be for NSF to heavily advertise that the brochure is available from NSF, and can be obtained in either paper copy or electronic mail versions. Such advertising could begin in late fall, specifying the date when the brochure is expected to be available. This would alert faculty to begin thinking about UFEP workshops as a possibility when making their summer plans, and might help alleviate some of the problems experienced by project directors, who found that many faculty had already made summer plans by the time the project director could arrange to advertise the workshop. Of course, NSF would need to identify the most appropriate ways for the brochure to be advertised, so that the advertisements reach all the potential audiences for UFEP workshops.

In conclusion, the Undergraduate Faculty Enhancement Program is meeting many of the needs it was designed to address. Faculty participants indicated that they received substantial benefits from the projects for themselves and for their teaching. Personal growth or renewal, increased knowledge of the field, and increased motivation or stimulation for teaching excellence are benefits most participants believe they received from project participation. The projects provided exposure to new ideas and technologies, which strongly influenced the introduction of new content and equipment into undergraduate courses. The projects successfully reached the intended audiences of "faculty who teach primarily undergraduate students" and groups that have been traditionally underrepresented in science, mathematics, and engineering, although there is room for improvement with regard to minority participation. However, information about all available UFEP projects needs to be more effectively disseminated by NSF if all potential audiences for UFEP are to be reached and served. In addition, travel costs may need to be subsidized in some way for some potential participants to be able to take advantage of the benefits available through UFEP projects.

APPENDIX A
ADDITIONAL UFEP PROJECTS

ADDITIONAL UFEP PROJECTS

In addition to the 92 workshops and short courses that form the basis for this report, UFEP funded several other kinds of projects. Information about these additional projects was obtained from NSF project records and files, rather than from questionnaires. These projects are described below.

UFEP Conferences

Of the four conferences supported by UFEP during its initial 3 years of operation, two were in geology, one in physics, and one in astronomy. Each of these conferences is briefly described below.

One of the geology conferences was a short course on dinosaurs. The 1-day conference was held during the annual meeting of the Geological Society of America in St. Louis, Missouri, in fall 1989. NSF provided $14,500 to fund travel costs for the 12 internationally recognized scientists who gave talks at the conference and provided chapters for the book published after the meeting. The balance of the costs for the conference was covered by the four sponsoring professional societies. The conference was attended by about 500 people. It was targeted toward college earth science teachers, but the conference review found that it was also attended by high school teachers, government personnel, and writers of educational materials and books. The conference was publicized through announcements in newsletters and journals, and all persons who sent in registration materials were accepted. No fee was charged for attendance.

The other geology conference was titled Conference on Triple Junction and Subduction Zone Tectonics for Undergraduate Geology Teachers. NSF provided $36,200 in funds for the 2-day conference, which was held in fall 1989 in conjunction with the National Association of Geology Teachers (NAGT) conference at Humboldt State University in California. The conference format consisted of 1 day of overview talks and workshops, and 1 day of field trips. There were 87 participants: 33 came from 4-year colleges, 36 came from 2-year colleges, 17 were high school teachers (partially supported by the NSF Teacher Enhancement Program), and 1 was listed as "other educator." Women were 22 percent of the participants. Participants were drawn primarily from the Farwest Section of NAGT. The conference was publicized by direct mailings to the members of the NAGT Farwest Section, and through NAGT publications. Participants were selected on a first-come, first-served basis.

The physics conference was on Computers in Physics Instruction. The 5-day conference took place at North Carolina State University in August 1988. There were 39 invited lectures, 122 contributed presentations, poster-demonstration sessions, 1-hour mini-workshops, and computers on display in the lobby. The conference was sponsored by the American

Institute of Physics, the American Physical Society, the American Association of Physics Teachers, and the National Science Teachers Association. The conference was supported by NSF (which contributed $116,400 of the total budget of $306,500, with $66,400 of the NSF funds coming from the UFEP budget) and numerous foundations and companies. A registration fee of $175 was charged. According to the project final report, the conference was attended by about 400 people, an estimated 300 men and 100 women. Participants came from all 50 States and numerous foreign countries. Of the 400 participants, 150 presented a contributed or invited paper. The conference targeted participants at precollege, undergraduate, and graduate levels. It was advertised by posters or brochures sent to departments for posting, direct mailings to members of professional organizations, announcements in newsletters or journals, and mailings to physics software authors and software publishers.

The astronomy conference was the International Astronomical Union (IAU) Colloquium on the Teaching of Astronomy, held at Williams College in Massachusetts in July 1989. The Colloquium was sponsored by IAU Commission 46 on the Teaching of Astronomy, and was attended by 162 people from 31 countries. The UFEP grant provided $10,000 for travel support for 31 people who were astronomy teachers and graduate students planning to be astronomy teachers. The average travel grant was $450. Of these 31 people, 27 were from the United States and 4 were from foreign countries. Of the 27 grants to U.S. citizens, 5 were to graduate students. The graduate students came from 4 different universities, and the other grant recipients were teachers from high schools and colleges.

Faculty-Mentor Enhancement Program

The Faculty-Mentor Enhancement Program was conducted by the American Society for Microbiology (ASM). NSF provided $61,400 in funding for this program. Faculty participants were paired with faculty mentors by ASM. Participants attended the ASM national meeting in June 1990, then spent 4 weeks in their mentor's lab during the summer of 1990. In addition, participants received a 2-day visit at their home institution from their mentor during academic year 1990-91. Nine participants were selected from 40 applicants; 9 mentors were selected from the 20 who applied. Of the nine participants, six were women and three were men; four participants were black; one participant was disabled. Minority and women faculty and faculty with physical disabilities were all targeted for recruitment. Participants were required to be full-time faculty members. The program was advertised by announcements in newsletters or journals; a mailing to 300 Fellows of the American Academy of Microbiology; and mailings to 535 liberal arts colleges, 700 microbiology educators, and the department chairs of 50 minority schools.

American Society for Engineering Education Faculty Professional Development Program

The American Society for Engineering Education (ASEE) Faculty Professional Development Program (FPDP) started in 1987 and gained NSF UFEP support in 1988. UFEP made one grant to FPDP in FY 1988 to cover summer 1988 courses, and an additional grant in FY 1989 to cover summer 1989-91 courses. The funding from UFEP for the 1988-90 courses was $735,800. Courses were 5 days to 2 weeks long. In 1987 and 1988, only electrical engineering/computer science (EE/CS) courses were offered; starting in 1989, mechanical engineering (ME) courses were added. The number of courses offered varied from year to year, with 9 courses in 1987, 8 courses in 1988, 14 courses in 1989, and 19 courses (listed in the catalog) in 1990. In 1988, NSF funded five courses, and industry funded three courses. For the 1989-91 grant, the NSF funds were used for the program generally, rather than for funding specific courses. The number of participants also varied from year to year, with 65 participants in 1987, 145 in 1988, 270 in 1989, and 240 in 1990, for a total of 720 participants during these years. Course tuition changed dramatically over the years, with no tuition fees paid by participants in 1987 and 1988, and most courses in 1990 charging $1,500 tuition per course. In 1990, scholarships for up to 80 percent of tuition ($1,200) were available on a limited basis, funded by NSF and industry contributions. Participants had to pay their own transportation to the course, and their own lodging and meals during the course.

National Chautauqua Workshop Program

UFEP made an initial grant in late FY 1988 to support Chautauqua workshops held in February through August of 1989. A second UFEP grant was made in FY 1989 to support workshops held in 1990-92. The funding from UFEP for the 1989-90 courses was $350,900. Chautauqua courses held in 1988, prior to receipt of NSF funding, served approximately 850 participants. The number of participants increased to about 1,230 in 1989, and to about 1,450 in 1990. The Council of Chautauqua Field Center Directors handles the national program administration and coordinates the activities of the Regional Field Centers. The number of Field Centers ranged from nine in 1988-89 to seven in 1990-91. Participants applied directly to the Field Centers and were selected by the Field Center Director. Courses also took place at Satellite Centers and Special Sites. The number of different courses offered each year ranged from 67 in 1989-90 to 81 in 1990-91. Course size was approximately 25 college teachers. Most courses were offered in sessions of 3 consecutive days. The usual registration fee charged for a 3-day course ranged from $150 for 1989 courses to $175 for 1991 courses. Participants or their institutions also paid the cost of lodging, meals, and travel. A comprehensive evaluation of the Chautauqua program is currently being planned by NSF.

APPENDIX B
TECHNICAL NOTES

TECHNICAL NOTES

Data for this assessment were collected in fall 1991 through mail questionnaires sent to UFEP project directors and telephone interviews conducted with participants in UFEP projects. Copies of the mail and telephone questionnaires are included in Appendix C.

Questionnaires were completed by directors of 91 out of the 92 eligible projects. Projects were eligible for the survey if the UFEP grant was received in FY 1988, 1989, or 1990, and at least one of the project sessions took place prior to January 1, 1991. The 92 eligible projects were headed by 82 different project directors; 10 project directors received 2 grants each. However, since the unit of response for these questionnaires is the project, rather than the person, responses to all items on this questionnaire are based on the 91 eligible projects with completed questionnaires.

Certain projects were excluded from the main data collection. Excluded were four conferences to which UFEP contributed funds, one faculty-mentor project, and the very large projects conducted by the American Society for Engineering Education and the National Chautauqua Workshop Program. These two large projects were excluded because their size and variability would have allocated too much of the participant sample to these projects and reduced the precision of the estimates based on participant responses. All the excluded projects are discussed in Appendix A of this report.

Participant Sample Selection

Sampling for the participant telephone interviews was based on lists of participants supplied by the UFEP project directors. These lists were edited to identify two things: (1) whether each participant was from a 2-year or 4-year school, and (2) whether each participant was from an Historically Black College or University (HBCU). The sampling frame constructed from the lists of participants contained 2,990 eligible participants, plus 95 ineligible participants. (The number of eligible participants was later reduced, due to additional inaccuracies in the sampling frame identified during data collection.) A participant was ineligible if he/she came from a college or university outside the United States, was a visitor or participant without NSF support, was from a high school or school district, was deceased, or was from some other kind of nonpostsecondary institution such as a private business. Among the participants in the sampling frame, 82 percent came from 4-year colleges and 18 percent came from 2-year colleges; 6 percent came from Historically Black Colleges and Universities and 94 percent came from non-HBCUs.

To draw the sample, the frame was divided into 11 strata. One stratum contained all participants from HBCUs. Another stratum contained all participants from 2-year, non-HBCUs. The other 9 strata contained all participants from 4-year, non-HBCUs, sorted by 3 levels of project size (number of participants: 1-19, 20-29, 30 or more) and 3 levels of workshop duration (7 days or less, 8-14 days, 15 or more days). Within each of the 11 strata, participants were sorted by discipline, which was grouped into 9 categories. A systematic sample of 500 participants was then selected with equal probability within each stratum. This selection resulted in a sample containing 75 participants from HBCUs, 150

participants from 2-year, non-HBCUs, and 275 participants from 4-year, non-HBCUs. These sample numbers represent 41 percent, 28 percent, and 12 percent, respectively, of the participants in these categories in the sampling frame of 2,990.

Completed telephone interviews were obtained with 469 of the 485 eligible participants, for a 97 percent response rate. The 15 people removed from the list of 500 sampled participants were those identified during data collection as having been on the participant lists in error, usually because they had not actually participated in the workshop or were project staff rather than participants. Data were weighted to reflect the universe of project participants (estimated to be 2,890), and were adjusted for questionnaire nonresponse. Questionnaire nonresponse ranged from 7 percent among participants at HBCUs to 2 percent among participants from 2-year colleges. Table B-1 shows the unweighted and weighted number of participant respondents presented by each classification variable used in the tables presented in Chapter 4.

Sampling and Nonsampling Errors

The response data from participants were weighted to produce national estimates. The weights were designed to adjust for the variable probabilities of selection and differential nonresponse. The findings in this report from the participant survey are estimates based on the sample selected and, consequently, are subject to sampling variability. The data from the project directors survey are not subject to sampling variability, since all projects were included with certainty.

The survey responses are also subject to nonsampling errors that can arise because of nonobservation (nonresponse or noncoverage) errors, errors of reporting, and errors made in collection of the data. These errors can sometimes bias the data. Nonsampling errors may include such problems as the differences in the respondents' interpretation of the meaning of the questions; memory effects; misrecording of responses; incorrect editing, coding, and data entry; differences related to the particular time the survey was conducted; or errors in data preparation. While general sampling theory can be used in part to determine how to estimate the sampling variability of a statistic, nonsampling errors are not easy to measure and, for measurement purposes, usually require that an experiment be conducted as part of the data collection procedures or that data external to the study be used.

To minimize the potential for nonsampling errors, the questionnaires were pretested with participants like those who completed the survey, and with a few of the project directors. During the design of the questionnaires and the questionnaire pretests, an effort was made to check for consistency of interpretation of questions and to eliminate ambiguous items. The questionnaires and instructions were extensively reviewed by the National Science Foundation and the Assessment Advisory Committee. Manual and machine editing of the questionnaires were conducted to check the data for accuracy and consistency. Cases with missing or inconsistent items were recontacted by telephone. Imputations for item nonresponse were not implemented, as item nonresponse was very low. Data were keyed with 100 percent verification.

Table B-1.—Unweighted and weighted number of participants by project, school, and participant characteristics used as classification variables

Classification variable	Number of participants	
	Unweighted	Weighted[1]
Total	469	2,890
Workshop duration		
7 days or less	310	1,876
8-14 days	96	640
15-28 days	63	374
Level of participant's school		
2-year	145	525
4-year	324	2,365
HBCU status of participants institution[2]		
HBCU	70	185
Non-HBCU	399	2,705
Years since receiving highest degree		
10 years or less	132	873
11-20 years	166	962
21 or more years	171	1,055
Participant's highest degree		
Less than doctorate	166	834
Doctorate	303	2,056
Highest degree granted in participant's department		
Associate's degree	141	515
Bachelor's degree	187	1,352
Master's degree	74	495
Doctorate degree	63	499
Other degree or no degree granted	4	28
Discipline of project		
Engineering	76	547
Chemistry	105	590
Mathematics	103	669
Physics, astronomy, and other physical sciences	37	266
Computer science and computer engineering	36	212
Life sciences	41	204
Atmospheric, geological, and environmental sciences; oceanography	23	144
Psychology and social sciences	23	168
Interdisciplinary/multidisciplinary	25	91

[1]Because of rounding, details may not add to totals.

[2]HBCU stands for Historically Black Colleges and Universities.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Variances

The standard error is a measure of the variability of estimates due to sampling. It indicates the variability of a sample estimate that would be obtained from all possible samples of a given design and size. Standard errors can be used as a measure of the precision expected from a particular sample. If all possible samples were surveyed under similar conditions, intervals of 1.96 standard errors below to 1.96 standard errors above a particular statistic would include the true population parameter being estimated in about 95 percent of the samples. This is a 95 percent confidence interval. For example, the estimated percentage of participants rating the workshop they attended as very valuable or worthwhile is 45 percent, and the estimated standard error is 2.4. The 95 percent confidence interval for the statistic extends from 45 - (2.4 times 1.96) to 45 + (2.4 times 1.96), or from 40 to 50 percent. Standard errors for selected statistics are provided in Tables B-2 through B-9.

Estimates of standard errors were computed using a technique known as jackknife replication. As with any replication method, jackknife replication involves constructing a number of subsamples (replicates) from the full sample and computing the statistic of interest for each replicate. The mean square error of the replicate estimates around the full sample estimate provides an estimate of the variance of the statistic. To construct the replications, 50 stratified subsamples of the full sample were created and then dropped one at a time to define 50 jackknife replicates. A proprietary computer program (WESVAR), available at Westat, Inc., was used to calculate the estimates of standard errors.

Table B-2.—Standard errors of the percentage of participants indicating how valuable or worthwhile various activities or resources were to them

Activity or resource	Perceived value rated on 5-point scale					Not applicable to project
	(1) Not at all valuable or worthwhile	(2)	(3)	(4)	(5) Very valuable or worthwhile	
Study materials sent before the session	0.9	1.3	2.0	1.8	1.8	2.5
Content of the lectures or seminars	(+)	0.9	1.4	2.5	2.6	--
Materials to be taken back to school	0.5	1.2	1.7	2.6	2.3	0.8
Hands-on learning activities	0.7	1.2	1.5	2.4	2.9	1.4
Interactions with the instructors	(+)	0.7	1.3	2.4	2.5	--
Informal interactions with other participants	0.3	0.6	1.5	2.3	2.0	0.4
Participant presentations	0.9	1.2	2.1	2.4	1.9	2.2
Library or computer software resources	0.9	1.6	2.0	2.4	1.9	2.1
Field trips	0.7	0.6	1.1	1.4	1.5	2.1
Followup activities	1.3	1.5	1.8	2.2	1.8	2.1

(+)Estimate of standard error is not reported because it is based on a statistic rounded to zero percent.

-- Not applicable.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table B-3.—Standard errors of the percentage of participants indicating that selected activities or resources were very valuable or worthwhile to them, by level of participant's school and highest degree received

Activity or resource	Total	School level		Participant's highest degree	
		2-year	4-year	Less than doctorate	Doctorate
Content of the lectures or seminars	2.6	3.7	2.9	4.6	2.9
Materials to be taken back to school	2.3	3.9	2.6	4.2	2.7
Hands-on learning activities	2.9	4.2	3.2	3.8	3.2
Interactions with instructors	2.5	3.7	3.0	4.1	3.0
Informal interactions with other participants	2.0	4.4	2.3	4.0	2.6

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table B-4.—Standard errors of the percentage of participants indicating how valuable or worthwhile the project was overall, by project, school, and participant characteristics

Project, school, or participant characteristic	Perceived value rated on 5-point scale				
	(1) Not at all valuable or worthwhile	(2)	(3)	(4)	(5) Very valuable or worthwhile
Total	0.6	1.0	1.4	2.5	2.4
Workshop duration					
7 days or less	0.7	1.3	1.5	3.1	2.9
8-14 days	0.0	2.0	3.0	5.2	5.0
15-28 days	2.3	2.3	5.0	6.0	7.0
Level of participant's school					
2-year	1.3	1.3	2.0	3.8	3.5
4-year	0.6	1.1	1.6	3.0	2.7
HBCU status of participants institution*					
HBCU	1.4	0.0	3.1	5.8	5.7
Non-HBCU	0.6	1.1	1.5	2.7	2.6
Years since receiving highest degree					
10 years or less	(+)	2.5	3.3	4.5	4.6
11-20 years	1.4	1.4	2.6	4.3	4.3
21 or more years	0.8	1.5	2.3	4.0	4.2
Participant's highest degree					
Less than doctorate	1.1	2.0	2.1	4.5	4.3
Doctorate	0.8	1.2	2.0	3.1	3.0
Highest degree granted in participant's department					
Associate's degree	1.4	1.4	2.1	3.9	3.5
Bachelor's degree	1.1	1.6	1.8	3.9	3.7
Master's degree	0.5	2.5	4.8	6.6	6.8
Doctorate degree	0.0	3.0	4.3	6.6	7.1

(+)Estimate of standard error is not reported because it is based on a statistic rounded to zero percent.

*HBCU stands for Historically Black Colleges and Universities.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table B-5.—Standard errors of the percentage of participants indicating the extent to which they received various benefits from their participation in the faculty project

Possible benefits	Extent of perceived benefit rated on 5-point scale				
	(1) Not at all	(2)	(3)	(4)	(5) Very much
Increased knowledge of the field	0.9	1.0	2.0	2.8	2.7
New perspectives on teaching and learning	0.9	1.5	1.8	2.2	1.9
Knowledge about and skill in using new instructional procedures, materials, or equipment	1.1	1.7	2.6	2.2	1.9
Personal growth or renewal	1.1	1.3	1.6	2.2	2.3
Information about other resources for use in teaching	1.2	1.4	2.4	2.5	2.0
Increased contacts with colleagues from other institutions	1.1	1.3	1.9	2.6	2.1
Increased scholarly activity	1.9	1.9	2.6	2.5	1.5
Increased motivation or stimulation for teaching excellence	1.0	1.3	2.0	2.5	2.0

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table B-6.—Standard errors of the percentage of participants indicating that they received selected benefits to the greatest extent possible ("very much") from their participation in the faculty project, by project, school, and participant characteristics

Project, school, or participant characteristic	Increased knowledge of the field	Knowledge/ skill with new instructional procedures, materials, or equipment	Personal growth or renewal	Increased contacts with colleagues from other institutions
Total	2.7	1.9	2.3	2.1
Workshop duration				
7 days or less	3.2	2.4	2.8	2.7
8-14 days	4.9	3.6	5.2	5.1
15-28 days	6.2	4.9	7.0	6.9
Level of participant's school				
2-year	4.6	3.1	3.7	4.7
4-year	3.0	2.2	2.6	2.4
Years since receiving highest degree				
10 years or less	3.9	2.8	4.4	4.2
11-20 years	3.7	3.6	3.3	3.9
21 or more years	4.7	4.1	4.5	4.1
Participant's highest degree				
Less than doctorate	4.5	3.3	4.4	4.8
Doctorate	3.0	2.3	2.5	2.5
Highest degree granted in participant's department				
Associate's degree	4.5	3.1	4.0	4.6
Bachelor's degree	4.2	3.1	3.4	3.4
Master's degree	6.2	4.9	5.9	5.9
Doctorate degree	5.9	5.9	5.9	5.4

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table B-7.—Standard errors of the percentage of participants indicating that they had engaged in various professional activities in the 3 years prior to their attendance at the faculty project, by school and participant characteristics

School or participant characteristic	Attended any professional meetings, seminars, or workshops	Delivered a paper at a professional meeting	Submitted an article to a professional journal	Participated in formal programs designed to develop curriculum or improve instruction
Total	1.2	2.3	2.3	2.5
Level of participant's school				
2-year	2.3	3.6	2.6	3.7
4-year	1.3	2.7	2.8	3.0
Years since receiving highest degree				
10 years or less	2.8	3.8	5.1	4.4
11-20 years	1.7	4.3	3.7	4.0
21 or more years	2.1	3.4	4.8	4.1
Participant's highest degree				
Less than doctorate	2.9	4.1	3.1	3.3
Doctorate	1.2	3.1	2.8	3.1
Highest degree granted in participant's department				
Associate's degree	2.3	3.6	2.6	3.6
Bachelor's degree	1.8	4.0	4.2	4.0
Master's degree	3.0	6.6	6.4	5.7
Doctorate degree	3.8	5.2	5.9	6.1

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table B-8.—Standard errors of the percentage of participants indicating that they engaged in various professional activities since returning from the faculty project, by school and participant characteristics

School or participant characteristic	Attended any professional meetings, seminars, or workshops	Delivered a paper at a professional meeting	Submitted an article to a professional journal	Participated in formal programs designed to develop curriculum or improve instruction
Total	1.1	2.5	2.4	2.7
Level of participant's school				
2-year	2.3	2.7	3.2	3.7
4-year	1.1	2.9	2.9	3.4
Years since receiving highest degree				
10 years or less	2.1	4.6	4.4	5.1
11-20 years	1.6	5.2	3.8	4.7
21 or more years	2.0	3.8	4.9	4.0
Participant's highest degree				
Less than doctorate	2.0	4.0	4.2	4.6
Doctorate	1.2	3.2	3.1	3.3
Highest degree granted in participant's department				
Associate's degree	2.3	3.1	3.3	3.7
Bachelor's degree	1.6	3.9	3.8	4.0
Master's degree	2.5	5.5	5.9	7.2
Doctorate degree	1.7	5.7	5.9	6.4

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program*, National Science Foundation, Division of Research, Evaluation, and Dissemination, 1992.

Table B-9.— Standard errors of the percentage of participants who engaged in various activities since returning from the faculty project, and the extent to which participation in these activities was influenced by their experience at the faculty project--continued on next page

Activity	Engaged in activity since returning	Extent influenced by experience at faculty project rated on 5-point scale*				
		(1) Not at all	(2)	(3)	(4)	(5) Very much
Course-related						
Modified your teaching methods	1.9	1.8	1.9	2.5	2.6	1.8
Acquired new equipment, materials, or computer software for undergraduate courses or laboratories	1.8	2.2	1.8	2.5	2.4	2.5
Developed new undergraduate courses or laboratories	2.2	2.2	1.7	2.6	2.1	2.8
Introduced new content into existing undergraduate courses or laboratories	1.1	1.6	2.2	2.1	2.3	2.2
Incorporated equipment, materials, or computer software into undergraduate courses or laboratories in ways in which they had not previously been used	2.1	1.8	1.6	2.3	2.7	2.1
Participated in formal programs designed to develop curriculum or improve instruction	2.7	3.1	2.2	2.9	2.3	1.7
Interactions with students						
Been involved with a research program for undergraduates	2.6	3.7	2.9	2.7	2.4	2.3
Arranged for undergraduate student field trips or site visits	2.4	3.6	2.7	3.3	2.2	2.2
Arranged for guest experts to come to the school for undergraduate seminars or demonstrations	2.5	3.4	2.3	2.5	2.0	1.9
Developed new or continued existing links with graduate faculty, government agencies, or industry that will benefit undergraduate students	2.4	3.5	2.6	3.2	2.4	1.8

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Table B-9.—Standard errors of the percentage of participants who engaged in various activities since returning from the faculty project, and the extent to which participation in these activities was influenced by their experience at the faculty project--continued from previous page

Activity	Engaged in activity since returning	Extent influenced by experience at faculty project rated on 5-point scale*				
		(1) Not at all	(2)	(3)	(4)	(5) Very much
Been involved with a student club or seminar series for undergraduates in your department or discipline	2.3	3.0	2.4	2.7	2.6	1.5
Encouraged and assisted undergraduate students with presentations at scientific meetings	2.8	4.1	2.9	2.9	2.7	2.3
Interactions with faculty colleagues						
Shared with colleagues new materials or skills you have acquired	1.5	1.7	2.0	2.3	2.7	2.0
Established new research or teaching collaborations with colleagues	2.3	2.8	2.0	2.8	2.7	2.1
Established new or continued existing usage of computer or other communication networks for communication with colleagues	2.3	2.4	2.1	3.5	2.7	2.0
Professional activities						
Attended professional meetings, seminars, or workshops	1.1	2.0	1.6	2.0	1.7	1.3
Delivered a paper at a professional meeting	2.5	3.6	2.0	2.8	2.3	2.2
Made a presentation to a local campus or community organization	2.6	3.0	2.0	2.0	2.6	1.9
Submitted an article to a professional journal	2.4	4.1	2.4	2.5	2.1	2.2
Initiated or expanded a research program	2.6	3.6	2.1	2.7	3.3	2.9
Served on boards, committees, or review panels of professional societies	2.7	3.2	2.2	2.7	2.0	2.2
Gained competence in a new area of your own or another discipline	2.2	1.9	1.7	2.1	2.8	2.3

*Percentages are based on those who said they had engaged in that activity since returning from the faculty project they attended.

SOURCE: *Assessment of the National Science Foundation's 1988-90 Undergraduate Faculty Enhancement Program, National Science Foundation*, Division of Research, Evaluation, and Dissemination, 1992.

APPENDIX C
QUESTIONNAIRES

OMB No. 3145-0125
Expires: 06/30/92

Assessment of the Undergraduate Faculty Enhancement Program

Survey of Project Directors

National Science Foundation
Office of Studies, Evaluation, and Dissemination

The National Science Foundation (NSF) is conducting an assessment of the Undergraduate Faculty Enhancement Program, for which you were a recent award recipient. The purpose of this survey is to provide NSF with descriptive information about the faculty enhancement projects, and to assist NSF in identifying the strengths of the program, as well as areas and issues of concern.

The faculty project for which we are seeking information is listed on the label below. Please correct any information on the label that is incorrect.

Please consult your project records to help you provide accurate information. However, where exact data are not available, estimates are acceptable. (Your estimates will be better than ours.) All information you provide is confidential and will be published in aggregate form only. Your response, though important for an accurate assessment, is voluntary, and failure to provide some or all of the information will in no way affect you or your institution. This information is solicited under the authority of the National Science Foundation Act of 1950, as amended.

Please return this form by November 1, 1991. Your cooperation in returning the survey questionnaire promptly is essential to the timely completion of the assessment. Please return the completed survey to:

Westat, Inc.
1650 Research Boulevard
Rockville, Maryland 20850
Attn: Dr. Laurie Lewis

If you have any questions regarding this survey, please contact Dr. Laurie Lewis at Westat's toll-free number, 800-937-8281, or contact Dr. Roger Baldwin of NSF at 202-357-7425.

Public reporting burden for this collection of information is estimated to average 90 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to:

Herman G. Fleming
Clearance Officer - Room 208
Division of Personnel and Management
National Science Foundation
Washington, DC 20550

and to

Office of Management and Budget
Paperwork Reduction Project (3145-0113)
Washington, DC 20503

I. Project Design and Implementation

1. How was the project structured? Please include information such as whether there were multiple workshops, whether the same participants returned for more than one workshop, whether the same or different topics were covered in multiple workshops, etc.

2a. When and where was the project held? Please provide beginning and ending dates, including year, for each workshop. DO NOT INCLUDE FOLLOWUP ACTIVITIES HERE.

2b. If you were to do the project again, what changes, if any, would you make in the length of the workshop(s)?

3a. Did you <u>seek</u> financial or in-kind support (e.g., donated equipment or chemicals, use of facilities) for the project from additional sources besides NSF? Include support sought from your institution, except do <u>not</u> include equipment or facilities supplied by your institution as part of its indirect costs.

- ☐ Yes
- ☐ No (SKIP Q3b,c)

3b. Did you <u>obtain</u> any financial or in-kind support for the project outside of NSF? Include support obtained from your institution, except do <u>not</u> include equipment or facilities supplied by your institution as part of its indirect costs.

- ☐ Yes
- ☐ No (SKIP Q3c)

3c. Please indicate the source, amount, and nature of any additional support received.

_____

_____

_____

_____

_____

4a. What kinds of activities did the project sessions include? (CHECK ALL THAT APPLY)

- ☐ Lecture/seminar
- ☐ Small discussion groups
- ☐ Laboratory or computer sessions
- ☐ Visiting a field site for demonstration purposes (e.g., laboratory or industrial plant tours)
- ☐ Field-based activity (e.g., collecting specimens, setting up instruments, collecting observational data)
- ☐ Participant presentations
- ☐ Participant projects
- ☐ Other; specify: _____

_____

_____

_____

4b. From the list in question 4a, please select up to 3 activities that comprise the major activities (i.e., those most often employed) during the project session. Please list those activities here.

1. _____

2. _____

3. _____

5a. Did the project require (or strongly encourage) preparation by participants prior to their arrival?

☐ Yes
☐ No (SKIP Q5b)

5b. What form did this prior preparation take (e.g., reading background material about the topic; preparing a problem or project to work on during the project)?

_____

_____

_____

_____

_____

6. For each of the following kinds of project assessments or evaluations, indicate at what points, if any, you asked participants to complete that kind of assessment or evaluation.

Kind of assessments or evaluations	Did not do this kind of assessment or evaluation	Time of assessment or evaluation			
		At the beginning of the workshop	During the workshop	After the workshop was over, but before the participants returned home	After the participants returned home
a. Knowledge and skills of participants					
b. Attitudes of participants toward undergraduate teaching					
c. Evaluation by participants of the workshop sessions.....					
d. Usefulness or value of project participation to participants' undergraduate teaching responsibilities at their home institutions.....					
e. Other; specify:					

II. Project Applicants and Participants

7a. How many participants did your project (as funded by NSF) call for? _____

7b. How many applications did you receive? _____

7c. How many applicants did you accept for participation? _____

7d. How many participants were there (total, and for each workshop of multi-workshop projects)?

Total participants:_____

Workshop #1:_____ Workshop #3:_____

Workshop #2:_____ Workshop #4:_____

8a. How did you recruit participants? (CHECK ALL THAT APPLY)

- ☐ Sent posters or brochures for posting in departments
- ☐ Sent program announcements to departments for distribution to all faculty
- ☐ Sent program announcements to department chairs or deans, and asked them to bring program to the attention of faculty who might want to participate
- ☐ Direct mailings to members of professional organizations
- ☐ Announcements in newsletters or journals
- ☐ Other; please specify: _____

8b. Did you limit your recruitment efforts in any of the following ways? (CHECK ALL THAT APPLY)

- ☐ Geographic region; specify:_____
- ☐ Type of college (e.g., only colleges not awarding a doctorate, only two-year colleges); specify:_____
- ☐ Characteristics of participants (e.g., only full-time faculty or faculty teaching in certain fields); specify:_____
- ☐ Only faculty nominated by department chairs or deans
- ☐ Only faculty with letters of support from department chairs or deans
- ☐ Other; specify:_____

_____

_____

8c. What problems, if any, did you encounter in the recruitment process? What would you do differently another time?

_____

_____

_____

_____

_____

9a. Did you try to increase the number of applications received from members of any of the following groups? (CHECK ALL GROUPS THAT WERE TARGETED FOR RECRUITMENT)

- ☐ Minority faculty
- ☐ Women faculty
- ☐ Faculty with physical disabilities
- ☐ Faculty from two-year institutions
- ☐ Other; please specify:_____
- ☐ Not applicable; none of these were target groups for recruitment (SKIP Q9b)

9b. How was the recruitment of these groups done?

_____

_____

_____

_____

_____

10. What criteria did you use to select participants from among those who applied? (Some examples of selection criteria include types of undergraduate courses taught by applicant, selection of participants to provide a national geographic distribution, statements of purpose provided by participants, preference to participants whose travel costs are borne by their home institution, preference to women or minority faculty.)

_____

_____

_____

_____

_____

III. Followup Activities

11a. Projects can have many kinds of followup activities associated with them. For each of the followup activities listed, please indicate by circling yes or no in column 1 whether that kind of followup activity has already taken place as part of your project.

For each followup activity that you indicated has already taken place as part of your project, please give your best estimate in column 2 of the number of project participants that took part in that followup activity.

Project followup activity	Has followup activity already taken place?		Number of project participants taking part in followup activity
a. Formal group sessions at scheduled times, as a continuing part of the project (e.g., a reunion symposium that participants are obligated to attend)	Yes	No	
b. Informal group get-togethers (e.g., at professional meetings)	Yes	No	
c. Written reports from participants sent to the project director	Yes	No	
d. Participant presentations at professional meetings	Yes	No	
e. Establishment of computer or other communication networks with participants	Yes	No	
f. Newsletter prepared by participants and/or the project director	Yes	No	
g. Continuing technical assistance to participants	Yes	No	
h. Visits by the project director to participants at their home institutions	Yes	No	
i. Sharing materials among participants	Yes	No	
j. Other; please describe:	Yes	No	

11b. Please provide a brief description of those followup activities to which you answered "yes" in Q11a. Please indicate the letter of the item in Q11a that you are describing.

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11c. Were th activities checked in Q11a the same ones you had planned in your proposal? If changes were made or activ s added or dropped, please indicate what these changes were.

11d. If you were to do the project again, what changes, if any, would you make in the followup activities?

11e. Are you planning to conduct additional followup activities in the future? What are these activities, and when do you plan for them to occur?

IV. Project Impact

12. There are a number of ways faculty members may benefit from participating in faculty enhancement projects. For each of the following, indicate the extent to which you believe participants derived that benefit from participating in the faculty enhancement project you directed. Please use a 5-point scale ranging from 1 to 5, with 1 being "not at all" and 5 being "very much."

____ a. Increased knowledge of the field

____ b. New perspectives on teaching and learning

____ c. Knowledge about and skill in using new instructional procedures, materials, or equipment

____ d. Personal growth or renewal

____ e. Information about other resources for use in teaching

____ f. Increased contact with colleagues from other institutions

____ g. Increased scholarly activity

____ h. Increased motivation or stimulation for teaching excellence

13. Project Directors may receive some of the same benefits from directing a faculty enhancement project that participants receive from attending such a project. For each of the following, indicate the extent to which you have derived that benefit from the faculty enhancement project you directed. Please use a 5-point scale ranging from 1 to 5, with 1 being "not at all" and 5 being "very much."

____ a. Increased knowledge of the field

____ b. New perspectives on teaching and learning

____ c. Knowledge about and skill in using new instructional procedures, materials, or equipment

____ d. Personal growth or renewal

____ e. Information about other resources for use in teaching

____ f. Increased contact with colleagues from other institutions

____ g. Increased scholarly activity

____ h. Increased motivation or stimulation for teaching excellence

____ i. Other, specify:_____

14. What kinds of feedback have you received from your institution regarding your direction of a faculty enhancement program? (CHECK ALL THAT APPLY)

- ☐ No feedback received
- ☐ Positive feedback about the recognition such a program can bring to this institution
- ☐ Encouragement to apply for other such programs in the future
- ☐ Positive feedback about the effect such a program has on the undergraduate teaching at this institution
- ☐ Positive feedback about your role in running such a program
- ☐ Negative feedback concerning the use of institutional or departmental resources
- ☐ Negative feedback about the effects running such a program will have on your career
- ☐ Attempts to discourage applications to direct such programs in the future
- ☐ Other; please specify: _____

_____

_____

_____

_____

V. Involvement with Similar Project Activities

15. Was this project the first time you have run or been involved with organizing a program of this sort?

- ☐ Yes
- ☐ No

16a. Since conducting this project, have you run or been involved in organizing any similar programs designed to meet the needs of faculty who teach undergraduate students?

- ☐ Yes
- ☐ No

16b. In the future, do you plan to run this or a similar project designed to meet the needs of faculty who teach undergraduate students?

- ☐ Yes
- ☐ No

VI. Project Staffing

17a. Were other members of your department, or another department at your institution, part of the staff of the project?

- ☐ Yes
- ☐ No (SKIP Q17b)

17b. Which of the following from your institution participated as staff, or assisted with the faculty program in some way? (CHECK ALL THAT APPLY)

- ☐ Faculty members
- ☐ Postdoctoral fellows
- ☐ Graduate students
- ☐ Undergraduate students
- ☐ Other; specify_____

18a. Did any of the project staff come from outside your institution?

- ☐ Yes
- ☐ No (SKIP Q18b)

18b. From where did these project staff come? (CHECK ALL THAT APPLY)

- ☐ Other colleges and universities
- ☐ Government agencies
- ☐ Professional organizations or societies
- ☐ Industry
- ☐ Other; specify: _____

19. What suggestions would you make to NSF to improve the Undergraduate Faculty Enhancement Program?

_____

_____

_____

_____

_____

_____

_____

_____

_____

VII. Demographic Information

20a. What is your highest degree? _____

20b. In what year did you receive your highest degree? _____

21a. What is the total number of years you have been a faculty member in higher education? _____

21b. Is your current institution the same institution at which you taught when you submitted your first successful proposal to the Undergraduate Faculty Enhancement Program?

- ☐ Yes
- ☐ No

21c. At the time you submitted your first successful proposal to the Undergraduate Faculty Enhancement Program, how many years had you been on the faculty of the institution where you were teaching at that time? _____

22. What was the highest degree granted in the department where you were teaching at the time you submitted your first successful proposal to the Undergraduate Faculty Enhancement Program? (CHECK ONE)

- ☐ Associate's
- ☐ Bachelor's
- ☐ Master's
- ☐ Doctorate
- ☐ Other; specify _____
- ☐ No degree granted

23. What discipline (major field) were you teaching at your institution when you submitted your first successful proposal to the Undergraduate Faculty Enhancement Program? (CHECK ALL THAT APPLY)

- ☐ Biology
- ☐ Physics
- ☐ Mathematics
- ☐ Geology
- ☐ Psychology
- ☐ Chemistry
- ☐ Computer science
- ☐ Engineering
- ☐ Astronomy
- ☐ Other; specify _____

24. What was your rank at the time you submitted your first successful proposal to the Undergraduate Faculty Enhancement Program?

CHECK HERE IF THE SCHOOL DOES NOT HAVE A RANKING SYSTEM FOR FACULTY ☐

- ☐ Full Professor
- ☐ Associate Professor
- ☐ Assistant Professor
- ☐ Other; please specify: _____

25. What was your tenure status at the time you submitted your first successful proposal to the Undergraduate Faculty Enhancement Program?

CHECK HERE IF THE SCHOOL DOES NOT HAVE A TENURE SYSTEM FOR FACULTY ☐

- ☐ Tenured
- ☐ Untenured
- ☐ Not Tenure Track

26a. Are you a U.S. citizen or permanent U.S. resident?

- ☐ Yes
- ☐ No (SKIP Q26b)

26b. Which one of the following best describes your racial/ethnic group? (CHECK ONLY ONE BOX)

- ☐ Black, non-Hispanic
- ☐ White, non-Hispanic
- ☐ Hispanic
- ☐ Asian or Pacific Islander
- ☐ American Indian or Alaskan Native

27. What is your sex?

- ☐ Male
- ☐ Female

OMB No. 3145-0125
Expires: 06/30/92

Assessment of the Undergraduate Faculty Enhancement Program
Survey of Project Participants

Conducted for:
National Science Foundation
Office of Studies, Evaluation, and Dissemination

Survey conducted by:
Westat, Inc.
1650 Research Boulevard
Rockville, Maryland 20850

Introduction to Selected Participant

Hello, my name is _____ and I am calling in regard to the Assessment of the Undergraduate Faculty Enhancement Program being conducted by the National Science Foundation. You have been selected for this survey as a participant in the faculty enhancement project: **[INTV: READ INFORMATION FROM LABEL ABOVE]**

Have you received the introductory letter about this study?

☐ YES (SKIP TO B)
☐ NO (GO TO A)

A. This survey is part of the assessment of the National Science Foundation Undergraduate Faculty Enhancement Program. We are seeking information from a sample of the faculty who attended these sessions to ascertain the outcomes of attendance. The results of this study will help the National Science Foundation to determine how well the various types of faculty enhancement projects are meeting the needs of undergraduate faculty, and will assist NSF in deciding on future program priorities. Approximately 500 participants have been selected to participate in a brief telephone interview. Your answers will be kept strictly confidential and will be used for statistical purposes only. While your participation is voluntary, it will contribute greatly to the success of this study. (GO ON TO B)

B. The interview will take about 30 minutes. I would like to conduct the interview now if it is convenient. [IF NOT READY:] When would be a good time to do the interview? [SET APPOINTMENT. ALWAYS VERIFY PHONE NUMBER AND ASK IF THERE IS A MORE DIRECT NUMBER.]

1. How did you learn about the faculty project you attended? **[INTV: PROMPT AS NECESSARY]**

(CIRCLE ALL THAT APPLY)

a.	FLYER, POSTER, OR LETTER PUT UP IN DEPARTMENT OR CIRCULATED BY FACULTY MAIL	1
b.	DIRECT MAILING RECEIVED BY PARTICIPANT	1
c.	DEAN OR DEPARTMENT CHAIR TOLD PARTICIPANT ABOUT IT	1
d.	OTHER FACULTY MEMBER (COLLEAGUE) TOLD PARTICIPANT ABOUT IT	1
e.	LEARNED ABOUT IT IN A JOURNAL OR NEWSLETTER, OR AT A PROFESSIONAL MEETING	1
f.	OTHER (SPECIFY BELOW)	1

_____

_____

2. Who paid for your travel to the faculty project you attended? **[INTV: PROMPT AS NECESSARY]**

(CIRCLE ALL THAT APPLY)

a.	HOME INSTITUTION (INCLUDING DEPARTMENT) PAID	1
b.	PARTICIPANT PAID	1
c.	SOME OTHER ORGANIZATION OR INSTITUTION PAID (SPECIFY BELOW)	1

_____

d.	NOT APPLICABLE -- TRAVEL WAS INCONSEQUENTIAL OR NOT NECESSARY	1
e.	OTHER (SPECIFY BELOW)	1

_____

_____

3a. Before you attended the faculty project, how much interest did your department Chair or Dean show in what you would be learning at the project? Would you say the department Chair or Dean showed:

(CIRCLE ONE)

A great deal of interest?	1
A moderate degree of interest?	2
A slight degree of interest?	3
No interest?	4

3b. Before you attended the faculty project, to what extent did your department Chair or Dean make any commitments about purchasing equipment or instructional materials related to the project you would be attending? Would you say the department Chair or Dean made:

(CIRCLE ONE)

A large degree of commitment?	1
A moderate degree of commitment?	2
A slight degree of commitment?	3
No commitment?	4
NOT APPLICABLE; PROJECT DID NOT INVOLVE EQUIPMENT OR MATERIALS AVAILABLE FOR PURCHASE	8

3c. After you returned from the faculty project, how much interest did your department Chair or Dean show in your participation in the project? Would you say the department Chair or Dean showed:

(CIRCLE ONE)

A great deal of interest?	1
A moderate degree of interest?	2
A slight degree of interest?	3
No interest?	4

3d. After you returned from the faculty project, did you or your department Chair or Dean purchase, or apply to purchase, equipment or instructional materials related to the project you attended?

(CIRCLE ONE)

YES	1
NO	2
NOT APPLICABLE; PROJECT DID NOT INVOLVE EQUIPMENT OR MATERIALS AVAILABLE FOR PURCHASE	8

3e. After you returned from the faculty project, did your department Chair or Dean provide you with any of the following kinds of assistance to aid in implementing what you had learned? Did the department Chair or Dean provide:

(CIRCLE ONE ON EACH LINE)

		YES	NO
a.	Release time	1	2
b.	Summer support	1	2
c.	Student teaching assistants	1	2
d.	Other support staff	1	2
e.	Other kinds of assistance (SPECIFY BELOW)	1	2

_____

_____

_____

4a. The next several questions refer to followup activities associated with the faculty project you attended. Examples of followup activities are newsletters sent by project directors or participants, followup conferences or group meetings, and informal group get-togethers for participants. We would like to know about these activities, regardless of whether you participated in them. Were there any followup activities associated with the faculty project you attended?

(CIRCLE ONE)

YES	1	(ASK Q4b)
NO	2	(SKIP Q4b-f; GO TO Q4g)

4b. Please describe each of those followup activities in a few words.
[INTV: LIST ONLY ONE FOLLOWUP ACTIVITY PER LINE]

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

4c. Did you actively participate in <u>any</u> of these followup activities?

(CIRCLE ONE)

YES	1	(ASK Q4d)
NO	2	(SKIP Q4d-e; GO TO Q4f)

4d. Which of the followup activities did you actively participate in?
[INTV: CIRCLE ACTIVITY NUMBER IN Q4b; READ LIST TO <u>R</u> IF NECESSARY]

4e. **INTV: DID <u>R</u> PARTICIPATE IN <u>ALL</u> FOLLOWUP ACTIVITIES OFFERED BY PROJECT (THAT IS, ARE ALL APPLICABLE ACTIVITY NUMBERS IN Q4b CIRCLED)?**

(CIRCLE ONE)

YES	1	(SKIP Q4f; GO TO Q4g)
NO	2	(ASK Q4f)

4f. What are the reasons that you did not participate in some of these followup activities? Would you say you did not participate because:

(CIRCLE ONE ON EACH LINE)

		YES	NO
a.	You thought you would not benefit very much from participating in this activity	1	2
b.	The activity was scheduled at an inconvenient time	1	2
c.	The activity was scheduled at an inconvenient location	1	2
d.	You were too busy to attend	1	2
e.	No travel money was available for attendance at the followup activity	1	2
f.	The appropriate equipment was not available for participation in the followup activity (e.g., no computer equipment or hookups; no lab equipment of the appropriate type)	1	2
g.	Other reasons (SPECIFY BELOW)	1	2

_____

_____

4g. Aside from any followup activities, have you been in contact with the project director or other participants?

(CIRCLE ONE)

YES	1	(ASK Q4h)
NO	2	(SKIP Q4h; GO TO Q5)

4h. Please explain briefly what other contacts you have had with the project director or other participants.

_____

_____

_____

_____

5. Faculty projects had many kinds of activities and resources associated with them. For each activity or resource I read, please indicate how valuable or worthwhile each was, on a scale ranging from 1 to 5, with 1 being "not at all valuable or worthwhile" and 5 being "very valuable or worthwhile." If the item is not applicable to the project you attended, please indicate "not applicable."

		Not at all valuable or worthwhile				Very valuable or worthwhile	Not applicable
a.	Study materials sent before the session	1	2	3	4	5	8
b.	Content of the lectures or seminars	1	2	3	4	5	8
c.	Materials to be taken back to your school	1	2	3	4	5	8
d.	Hands-on learning activities, such as laboratories or computer work	1	2	3	4	5	8
e.	Interactions with the instructors (both structured and unstructured)	1	2	3	4	5	8
f.	Informal interactions with other participants	1	2	3	4	5	8
g.	Participant presentations	1	2	3	4	5	8
h.	Library or computer software resources	1	2	3	4	5	8
i.	Field trips	1	2	3	4	5	8
j.	Followup activities	1	2	3	4	5	8

6. Using the same 5-point scale, that is, with 1 being "not at all valuable or worthwhile" and 5 being "very valuable or worthwhile, how valuable or worthwhile did you find the project, overall? _____

7a. Were you introduced in the faculty project you attended to technologies that were new to you, or that you had never previously had a chance to try?

(CIRCLE ONE)

YES	1	(ASK Q7b,c)
NO	2	(SKIP Q7b,c; GO TO Q8)

7b. To what extent did you find these new technologies applicable to or useful for your undergraduate teaching responsibilities at your college? Would you say they were:

(CIRCLE ONE)

Very useful or applicable?	1
Somewhat useful or applicable?	2
Not at all useful or applicable?	3

7c. To what extent did you find these new technologies applicable to or useful for your research activities? Would you say they were:

(CIRCLE ONE)

Very useful or applicable? 1

Somewhat useful or applicable? 2

Not at all useful or applicable? 3

8. There are a number of ways faculty members may benefit from participating in faculty projects. For each of the following, please indicate the extent to which you have derived that benefit from your participation in the faculty project you attended, using a scale ranging from 1 to 5, with 1 being "not at all" and 5 being "very much."

		Not at all				Very much	Not applicable
a.	Increased knowledge of the field	1	2	3	4	5	8
b.	New perspectives on teaching and learning	1	2	3	4	5	8
c.	Knowledge about and skill in using new instructional procedures, materials, or equipment	1	2	3	4	5	8
d.	Personal growth or renewal	1	2	3	4	5	8
e.	Information about other resources for use in teaching	1	2	3	4	5	8
f.	Increased contact with colleagues from other institutions	1	2	3	4	5	8
g.	Increased scholarly activity	1	2	3	4	5	8
h.	Increased motivation or stimulation for teaching excellence	1	2	3	4	5	8

9. In the three years prior to your attendance at the faculty project, had you:

(CIRCLE ONE ON EACH LINE)

		YES	NO
a.	Attended any professional meetings, seminars, or workshops	1	2
b.	Delivered a paper at a professional meeting	1	2
c.	Submitted an article to a professional journal	1	2
d.	Participated in formal programs designed to develop curriculum or improve instruction	1	2

10. The following are a broad range of activities in which faculty sometimes engage. We would like to know whether you have engaged in these activities since returning from the faculty project you attended, regardless of their relationship to that faculty project. Since returning from the faculty project, have you: **[INTV: READ ALL OF COLUMN A]**

[INTV: AFTER FINISHING COLUMN A, SAY:] I will now read the activities to which you answered "yes." For each of these activities, please indicate to what extent, if any, your experience at the faculty project influenced what you have done. Rate the amount of influence on a scale ranging from 1 to 5, with 1 being "not at all" and 5 being "very much."

Activity	A. Circle one		B. Circle one				
	YES	NO	Not at all				Very much
Course-related							
a. Modified your teaching methods	1	2	1	2	3	4	5
b. Acquired new equipment, materials, or computer software for undergraduate courses or laboratories	1	2	1	2	3	4	5
c. Developed new undergraduate courses or laboratories	1	2	1	2	3	4	5
d. Introduced new content into existing undergraduate courses or laboratories	1	2	1	2	3	4	5
e. Incorporated equipment, materials, or computer software into undergraduate courses or laboratories in ways in which they had not previously been used	1	2	1	2	3	4	5
f. Participated in formal programs designed to develop curriculum or improve instruction	1	2	1	2	3	4	5
Interactions with students							
g. Been involved with a research program for undergraduates	1	2	1	2	3	4	5
h. Arranged for undergraduate student field trips or site visits	1	2	1	2	3	4	5
i. Arranged for guest experts to come to the school for undergraduate seminars or demonstrations	1	2	1	2	3	4	5
j. Developed new or continued existing links with graduate faculty, government agencies, or industry that will benefit undergraduate students	1	2	1	2	3	4	5
k. Been involved with a student club or seminar series for undergraduates in your department or discipline	1	2	1	2	3	4	5
l. Encouraged and assisted undergraduate students with presentations at scientific meetings	1	2	1	2	3	4	5
Interactions with faculty colleagues							
m. Shared with colleagues new materials or skills you have acquired	1	2	1	2	3	4	5
n. Established new research or teaching collaborations with colleagues	1	2	1	2	3	4	5
o. Established new or continued existing usage of computer or other communication networks for communication with colleagues	1	2	1	2	3	4	5
Professional activities							
p. Attended professional meetings, seminars, or workshops	1	2	1	2	3	4	5
q. Delivered a paper at a professional meeting	1	2	1	2	3	4	5
r. Made a presentation to a local campus or community organization	1	2	1	2	3	4	5
s. Submitted an article to a professional journal	1	2	1	2	3	4	5
t. Initiated or expanded a research program	1	2	1	2	3	4	5
u. Served on boards, committees, or review panels of professional societies	1	2	1	2	3	4	5
v. Gained competence in a new area of your own or another discipline	1	2	1	2	3	4	5

11a. Are you aware of the short courses for college faculty offered by the Chautauqua Centers and by the American Society for Engineering Education (ASEE)?

(CIRCLE ONE)

YES	1	(ASK Q11b)
NO	2	(SKIP Q11b; GO TO Q12a)

11b. Have you ever attended any of the short courses for college faculty offered by the Chautauqua Centers or the American Society for Engineering Education (ASEE)?

(CIRCLE ONE)

YES	1
NO	2

DEMOGRAPHIC DATA

12a. What is your highest degree?

(CIRCLE ONE)

DOCTORATE - Ph.D.	1
DOCTORATE - Ed.D. **[INVT: IF NECESSARY ASK "Is that a Ph.D. or an Ed.D.?"]**	2
MASTER'S DEGREE (M.S., M.A.)	3
BACHELOR'S DEGREE (B.A., B.S.)	4
OTHER (SPECIFY BELOW)	5

_____

12b. In what year did you receive your highest degree? 19_____

13a. What is the total number of years you have been a faculty member in higher education? _____years

13b. Is your current institution the same institution at which you taught when you participated in the faculty project?

(CIRCLE ONE)

YES	1	(SKIP Q13c; GO TO Q13d)
NO	2	(ASK Q13c)

13c. What is the name of the institution where you taught when you participated in the faculty project?

_____

13d. At the time you participated in the faculty project, how many years had you been on the faculty of the institution where you were teaching at that time? _____years

14. What was the highest degree granted in the department where you were teaching when you participated in the faculty project?

(CIRCLE ONE)

ASSOCIATE'S (A.A., A.S.)	1
BACHELOR'S (B.A., B.S., B.S.E)	2
MASTER'S (M.A., M.S.)	3
DOCTORATE - Ph.D.	4
DOCTORATE - Ed.D. **[INTV: IF NECESSARY ASK: "Is that a Ph.D. or an Ed.D.?"]**	5
OTHER (SPECIFY BELOW)	6
_____	
NO DEGREE GRANTED	7

15. What discipline (that is, major field) were you teaching at your institution when you attended the faculty project? **[INTV: CIRCLE ALL DISCIPLINES GIVEN; PROMPT AS NECESSARY]**

[INTV: AFTER FINISHING COLUMN A, SAY:] How many other full-time faculty taught [DISCIPLINE CIRCLED IN COLUMN A] at that institution when you attended the faculty project?

Discipline	A. Circle "1" if yes	B. Number of faculty
a. ASTRONOMY	1	_____
b. BIOLOGY	1	_____
c. CHEMISTRY	1	_____
d. COMPUTER SCIENCE	1	_____
e. ENGINEERING	1	_____
f. GEOLOGY	1	_____
g. MATHEMATICS	1	_____
h. PHYSICS	1	_____
i. PSYCHOLOGY	1	_____
j. SOCIOLOGY	1	_____
k. OTHER (SPECIFY BELOW)	1	_____
_____		
_____		

16. What was your rank at the time you participated in the faculty project?

(CIRCLE ONE)

FULL PROFESSOR	1
ASSOCIATE PROFESSOR	2
ASSISTANT PROFESSOR	3
OTHER (SPECIFY BELOW)	4
_____	
NOT APPLICABLE; SCHOOL DOES NOT HAVE A RANKING SYSTEM FOR FACULTY	8

17. What was your tenure status at the time you participated in the faculty project?

(CIRCLE ONE)

TENURED	1
UNTENURED	2
NOT TENURE TRACK	3
NOT APPLICABLE; SCHOOL DOES NOT HAVE A TENURE SYSTEM FOR FACULTY	8

18. In the last three years, which of the following levels of courses have you taught?

(CIRCLE ONE ON EACH LINE)

		YES	NO
a.	Introductory courses	1	2
b.	Other lower division undergraduate courses	1	2
c.	Upper division undergraduate courses	1	2
d.	Graduate level courses	1	2
e.	NO COURSES TAUGHT	1	2

19a. Are you a U.S. citizen or permanent U.S. resident?

(CIRCLE ONE)

YES	1	(ASK Q19b)
NO	2	(SKIP Q19b; GO TO Q20)

19b. **[INTV: ASK FOR U.S. CITIZENS OR PERMANENT RESIDENTS ONLY]**

Which one of the following best describes your racial/ethnic group?

(CIRCLE ONE)

Black, non-Hispanic	1
White, non-Hispanic	2
Hispanic	3
Asian or Pacific Islander	4
American Indian or Alaskan Native	5

20. **[INTV: CIRCLE ONE FOR RESPONDENT'S SEX:]**

MALE	1
FEMALE	2

Those are all the questions I have. Thank you very much for your assistance with the survey.

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